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Original Research Article

A Comparative Study of Myoinositol and Metformin for Ovulation Induction in Pregnant Women with PCOS

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Abstract: ***Introduction:*** PCOS is a common condition in women of reproductive age characterized by ovulatory dysfunction, androgen excess and polycystic ovaries. Myoinositol and metformin have both been studied as potential treatment options for inducing ovulation in women with PCOS. ***Aim of the Study:*** The aim of the study was to compare the use of myoinositol and metformin for ovulation induction in pregnant women with PCOS. ***Methods:*** This comparative observational cross-sectional study was conducted at the Manikganj 250 Bedded Sadar hospital, Dhaka, Bangladesh from January 2022 to December 2022. A total of 100 patients with PCOS were selected for this study. The participants were divided into 2 equal groups of 50 patients each, where patients in the first group were treated with myoinositol, and patients in the second group were treated with metformin. ***Result:*** In our study, there was a decrease in mean weight, BMI, and waist-hip ratio of both groups after treatment but with no statistically significant ($p>0.05$) difference between the groups. There was an improvement in menstrual cycle in both groups after treatment with no statistically significant ($p>0.05$) difference between the groups. The LH/FSH ratio decreased more in the myoinositol group after treatment compared to the metformin group but there was no statistically significant ($p>0.05$) difference between the groups. Fasting Insulin decreased similarly in both groups but there was no statistically significant ($p>0.05$) difference between the groups. HOMA-IR decreased in both groups with a statistically significant ($p<0.05$) difference after treatment. We found that myo-inositol administration in PCOS subjects led to statistically significant ($p<0.05$) decreases in FAI compared to the metformin group. Ovarian volume decreased from 12.59±5.15 cm3 to 10.05±4.50 cm3 in the myoinositol group and 12.90±5.62 cm3 to 10.65±4.10 cm3 in metformin group. The groups had no statistically significant ($p>0.05$) difference. The conception rate was 40% in the myoinositol group compared to 34% in the metformin group, although there was no statistically significant difference ($p>0.05$) between the groups. In the myoinositol group most of the study subjects (82%) had no adverse effect after treatment. On the other hand, in the metformin group 34% had no adverse effect, 30% had a weakness, 26% had nausea, 8% had abdominal pain and 2% had vomiting. ***Conclusion:*** Both therapy methods showed a noticeable improvement in BMI, menstrual cycle, clinical parameters, and pregnancy outcome for PCOS; however, when comparing the two groups, no significant difference was seen in most data. Still, myoinositol is more effective in treating insulin resistance androgen levels and has fewer adverse effects. Thus, myoinositol can also be used as an alternative to metformin to treat PCOS.

Keywords: Myoinositol, Metformin, Ovulation Induction, Pregnant Women, and PCOS.

INTRODUCTION

The most prevalent endocrine condition in women of reproductive age is Polycystic Ovarian Syndrome (PCOS), which affects 6–15% of them [1-3]. Menstrual irregularities, hirsutism, and infertility in women due to anovulatory failure are all caused mainly by it [4]. Women with PCOS may also have other comorbidities including psychological (anxiety, body image, depression), metabolic (obesity, insulin resistance, metabolic syndrome, prediabetes, type 2 diabetes), cardiovascular risk factors (hypertension,

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dyslipidemia), and increased risk for sleep apnea, endometrial carcinoma, and pregnancy-related complications (gestational diabetes, preeclampsia, pregnancy-induced hypertension, postpartum hemorrhage and infection, preterm delivery, meconium aspiration, stillbirth, operative deliveries, and shoulder dystocia) [2, 5-7].

Consequently, PCOS harms quality of life, general health, and sexual and reproductive health [3]. It is a condition marked by oligomenorrhoea, anovulation/ oligoanovulation, insulin resistance, increased androgen release by the ovaries, irregular menstrual cycles, hirsutism, alopecia, and acne, as well as a variety of clinical symptoms [8]. PCOS raises a woman's risk of infertility, abnormal uterine bleeding, endometrial cancer, insulin resistance, dyslipidemia, and hypertension—all risk factors for cardiovascular disease (CVD)-and hypertension dyslipidemia, and dyslipidemia. The higher prevalence of metabolic syndrome in this population may be linked to the potential elevated risk of CVD [9]. In addition to lifestyle changes, the use of insulin-sensitizers such metformin has been suggested to address the long-term health effects in PCOS patients [10].

Previous research suggested that either alone or combined with clomiphene citrate, metformin might boost ovulation and pregnancy rates in PCOS patients by reducing hyperinsulinemia, hyperandrogenemia, and restoring hyperinsulinemia, hyperandrogenemia, and restoring ovulatory function [11-13]. Furthermore, nonrandomized prospective studies revealed that metformin may lessen spontaneous abortions in the first trimester in PCOS women [14, 15]. Metformin may reduce weight, lessen insulin resistance, lower testosterone levels, and restore normal menstrual cyclicity and ovulation, according to the data currently available, although its usage may be constrained by gastrointestinal side effects [16, 17]. Myo-inositol, a precursor in the phosphatidyl-inositol secondary messenger pathway, has therefore been utilized to treat PCOS patients as alternative medication [18] Myo-inositol has been shown in a few trials to improve insulin sensitivity, testosterone levels, and inflammatory markers [19, 20].

Myoinositol consumption also enhanced PCOS patients' reproductive axis functionality by lowering their hyperinsulinemic condition [21]. No negative effects have been associated with myo-inositol therapy, in contrast to metformin [22]. Myo-inositol generates inositol triphosphate, a second messenger, which controls the release of several hormones, including thyroid-stimulating hormone and follicle-stimulating hormone, as well as the intake of glucose, which improves insulin sensitivity [23, 24]. Myoinositol enhances ovarian function, lowers the ratio of luteinizing hormone to follicle-stimulating hormone (LH/FSH), lowers serum androgens, raises sex hormone-binding globulin (SHBG), and lowers total and free testosterone levels in the blood [25]. To the best of our knowledge, there aren't many studies comparing myo-inositol and metformin for ovulation induction in pregnant women with PCOS [26]. Therefore, this current study was conducted to compare the use of myoinositol and metformin for ovulation induction in pregnant women with PCOS.

OBJECTIVE

- To compare the use of myoinositol and metformin for ovulation induction in pregnant women with PCOS.

METHODS

This comparative observational cross-sectional study was conducted at the Manikganj 250 Bedded Sadar hospital, Dhaka, Bangladesh. The study duration was 1 year, from January 2022 to December 2022. During this period, 100 patients with PCOS were selected following the inclusion and exclusion criteria for their participation in this study. The participants were divided into 2 equal groups of 50 patients each. Patients in the first group were treated with myoinositol and patients in the second group were treated with metformin for ovulation induction. Participants of the myoinositol group received myoinositol 1 gm twice daily & those of the metformin group received 500 mg metformin tablet twice daily. The patients were called for follow-up after 16 weeks of drug therapy and then all the baseline measurements were repeated and compared. Informed consent was obtained from each participant, and ethical approval regarding the study was also obtained from the ethical review committee of the study hospital. All necessary data was collected from hospital records and face-to-face interviews and was analyzed using the SPSS software. Associations of continuous data were assessed using student t-test. Associations of categorical data were assessed using Chi-square test. The value of $p<0.05$ was considered significant.

Inclusion Criteria

- Childbearing age group.
- Patients who had given consent to participate in the study.

Exclusion Criteria

- Patients affected with other chronic diseases.
- Patients transferred to another hospital.

RESULTS

Table I demonstrates the comparison of the general characteristics between the two groups. In our study mean (±SD) age was 24.54±3.56 years and 25.10±3.12 years in myoinositol group and metformin group, respectively. There was no statistically significant ($p>0.05$) difference in age between the

groups. There was decrease in mean weight, BMI, and waist hip ratio of both groups after treatment but there was no statistically significant (p>0.05) difference between the groups. Mean (±SD) duration of infertility was 4.15±2.25 years and 4.31±2.55 years in myoinositol group and metformin group, respectively. Table II shows the comparison of the menstrual cycle between the two groups. There was improvement in menstrual cycle in both groups after treatment but there was no statistically significant (p>0.05) difference between the groups. Table III demonstrates the comparison of improvement in various clinical parameters before and after treatment in the two groups.

The LH/FSH ratio decreased more in the myoinositol group after treatment than the metformin group but there was no statistically significant (p>0.05) difference between the groups. Fasting Insulin decreased similarly in groups but there was no statistically significant (p>0.05) difference between the groups. Homeostatic Model Assessment of Insulin Resistance (HOMA-IR) in myoinositol group decreased from 3.24±2.20 to 2.41±1.45 and in metformin group it decreased from 3.31±2.12 to 3.10±1.95. There was a statistically significant (p<0.05) difference between the groups in post-treatment value of HOMA-IR. We found that myo-inositol administration in PCOS subjects led to a statistically significant (p<0.05) decrease in the free androgen index (FAI) compared to the metformin group. Ovarian volume decreased from 12.59±5.15 cm3 to 10.05±4.50 cm3 in the myoinositol group and 12.90±5.62 cm3 to 10.65±4.10 cm3 in the metformin group. The groups had no statistically significant (p>0.05) difference. Table IV shows the pregnancy outcome after treatment. The rate of conception in the myoinositol group was 40% which is higher than the conception rate of 34% in the metformin group but there was no statistically significant (p>0.05) difference between the groups. Figure 1 shows the adverse effects of the drugs. In the myoinositol group, the majority of the study subjects (82%) had no adverse effect after treatment, followed by 12% had menorrhagia, 4% had nausea and 2% had a weakness. On the other hand, in the metformin group, 34% had no adverse effect, 30% had a weakness, 26% had nausea, 8% had abdominal pain and 2% had vomiting.

Table-I: Comparison of the general characteristics between the two groups. (N=100)

Parameters		**Myoinositol group (n=50)**	**Metformin group (n=50)**	**p value**
Age (Years)	Mean ± SD	24.54±3.56	25.10±3.12	0.4049^{ns}
Weight (kg)	Before treatment	68.78±4.32	69.21±4.85	0.6407^{ns}
	After treatment	66.38±4.10	67.22±3.89	0.5832^{ns}
BMI (kg/m^2)	Before treatment	26.96±4.91	27.08±3.65	0.8900^{ns}
	After treatment	25.85±4.76	26.43±3.44	0.4866^{ns}
Waist hip ratio	Before treatment	0.83±0.07	0.84±0.08	0.5075^{ns}
	After treatment	0.82±0.10	0.83±0.09	0.6004^{ns}
Duration of infertility (years)	Mean ± SD	4.15±2.25	4.31±2.55	0.7401^{ns}

Table-II: Comparison of the menstrual cycle between the two groups (N=100)

Menstrual cycle		**Myoinositol group (n=100)**	**Metformin group (n=100)**	***p* value**
Before treatment	Regular	17 (34%)	18 (36%)	0.8348^{ns}
	Irregular	33 (66%)	32 (64%)	
After treatment	Regular	28 (56%)	35 (70%)	0.1491^{ns}
	Irregular	22 (44%)	15 (30%)	

Table-III: Comparison of improvement in various clinical parameters before and after treatment in the two groups (N=100)

Parameters		**Myoinositol group (n=100)**	**Metformin group (n=100)**	***p* value**
LH (U/L)	Before treatment	9.80±6.35	8.69±7.10	0.4119^{ns}
	After treatment	9.55±5.25	9.35±5.48	0.8526^{ns}
FSH (U/L)	Before treatment	5.20±1.05	5.45±1.11	0.2501^{ns}
	After treatment	5.38±0.88	5.50±0.90	0.5018^{ns}
LH/FSH	Before treatment	1.85±0.80	1.57±0.86	0.0950^{ns}
	After treatment	1.76±0.71	1.68±0.55	0.5303^{ns}
Fasting Insulin (μU/ ml)	Before treatment	16.21±10.02	15.95±10.05	0.8972^{ns}
	After treatment	15.85±9.65	14.75±9.75	0.5720^{ns}
HOMA-IR	Before treatment	3.24±2.20	3.31±2.12	0.8666^{ns}
	After treatment	2.41±1.45	3.10±1.95	0.0474^{s}
FAI	Before treatment	6.55±1.68	5.90±1.19	0.0279^{s}
	After treatment	5.65±1.02	5.25±0.89	0.0393^{s}
Ovarian volume (cm^3)	Before treatment	12.59±5.15	12.90±5.62	0.7743^{ns}
	After treatment	10.05±4.50	10.65±4.10	0.4875^{ns}

Table-IV: Pregnancy outcome after treatment (N=100)

Pregnancy outcome		Myoinositol group (n=50)	Metformin group (n=50)	*p* value
Conception	Yes	20 (40%)	17 (34%)	0.5364^{ns}
	No	30 (60%)	33 (66%)	

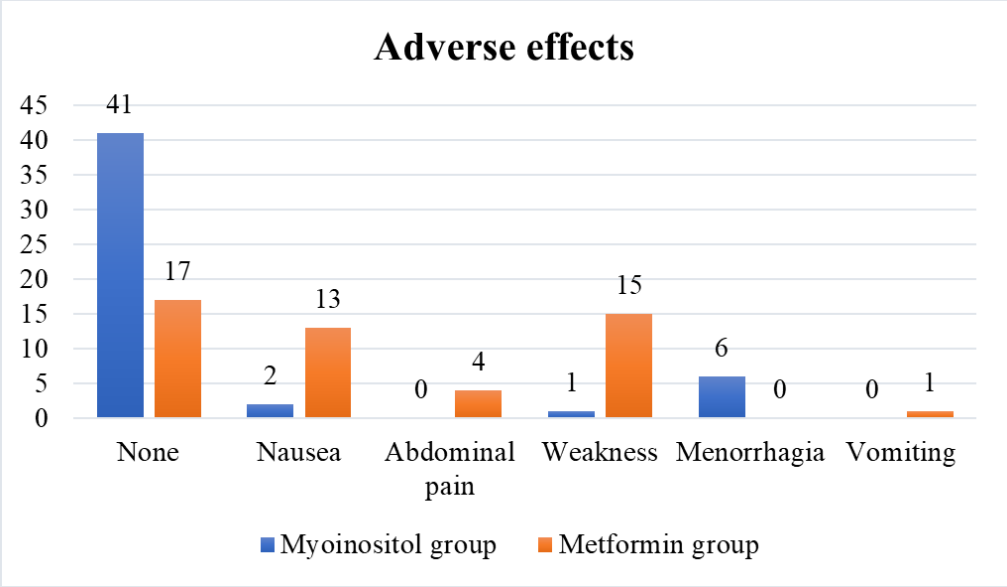

Figure 1: Adverse effects of the drugs (N=100)

DISCUSSION

Infertility, ovarian dysfunction, and irregular menstruation are most frequently caused by polycystic ovary syndrome (PCOS) [27]. PCOS is associated with insulin resistance and with a certain number of metabolic disorders [28, 29]. The treatment of insulin resistance and hyperinsulinemia includes the use of insulin-sensitizers (metformin, thiazolidinediones, and inositols) [30]. This current study was conducted to compare the use of myoinositol and metformin for ovulation induction in pregnant women with PCOS. In our study mean (±SD) age was 24.54±3.56 years and 25.10±3. 12 years in myoinositol group and metformin group, respectively. There was no statistically significant (p>0.05) difference between the groups. There was decrease in mean weight, BMI, and waist hip ratio of both groups after treatment but there was no statistically significant (p>0.05) difference between the groups. In the study of NEHRA J. *et al.*, [31] there was a statistically significant reduction in BMI at 12 and 24 w compared to baseline values in both the groups. In myoinositol group mean reduction in BMI was from 26.45 (baseline) to 25.31 (24 w), showed a decrease of 1.14. In metformin group mean reduction in BMI was from 26.09 (baseline) to 24.96 (24 w), showed a decrease of 1.13.

Their findings are similar to ours. Mean (±SD) duration of infertility was 4.15±2.25 years and 4.31±2.55 years in myoinositol group and metformin group, respectively. Similar result found in the study of Prabhakar P *et al.*, [32] mean duration of infertility was 3.44±1.92 days and 3.19±2.46 days in myoinositol and metformin groups, respectively. There was improvement in menstrual cycle in both groups after treatment but there was no statistically significant (p>0.05) difference between the groups. In the study of Angik R *et al.*, [33] after six months of treatment, 20 (37.73%) achieved regular cycles, 28.57% with myoinositol and 48% after metformin treatment which is familiar to our study. The LH/FSH ratio decreased more in myoinositol group after treatment compared to metformin group but there was no statistically significant (p>0.05) difference between the groups. Fasting Insulin decreased similarly in groups but there was no statistically significant (p>0.05) difference between the groups.

Homeostatic Model Assessment of Insulin Resistance (HOMA-IR) in myoinositol group decreased from 3.24±2.20 to 2.41±1.45 and in metformin group it decreased from 3.31±2.12 to 3. 10±1.95. There was statistically significant (p<0.05) difference between the groups in post-treatment value of HOMA-IR. Vincenzo *et al.*, [34] found that metformin group and myoinositol both showed significant improvement in regularization of menses and reduction insulin glucose and HOMA, testosterone, and LH. In another study of Shokrpour M. *et al.*, [35] myo-inositol supplementation, compared with metformin, significantly reduced HOMA-IR. We found that myo-inositol administration in PCOS subjects led to statistically significant (p<0.05) decreases in free androgen index (FAI) compared to metformin group. Jamilian M *et al.*, [36] FAI decreased in both group but there was no statistically significant (p>0.05) difference between the groups. Ovarian volume decreased from 12.59±5.15 cm^3 to 10.05±4.50

cm^3 in myoinositol group and 12.90±5.62 cm^3 to 10.65±4.10 cm^3 in metformin group.

There was no statistically significant (p>0.05) difference between the groups. Tagliaferri V *et al.*, [37] there was decrease of ovarian volume in both group through there was no statistically significant (p>0.05) difference between the groups. The rate of conception in myoinositol group was 40% which is higher than the conception rate of 34% in metformin group but here was no statistically significant (p>0.05) difference between the groups. In the study of Angik R *et al.*, [33] conception occurred in 36.84% with myoinositol, and 33.33% with metformin. In myoinositol group, majority of the study subjects (82%) had no adverse effect after treatment, followed by 12% had menorrhagia, 4% had nausea and 2% had weakness. On the other hand, in the metformin group, 34% had no adverse effect, 30% had weakness, 26% had nausea, 8% had abdominal pain and 2% had vomiting. Angik R *et al.*, [33] found that in the myoinositol group only 16% patients experienced side effects in contrast to 72% in the metformin group. In the metformin group, 2% of patients had lactic acidosis, 38% generalized weakness, and 32% had nausea whereas 14% had menorrhagia and 2% had nausea in the myoinositol group. In another study of Nehra J *et al.*, [38] except for menorrhagia, which was observed solely with MI, and dizziness, which was the same in both groups, the incidence of different adverse medication events was higher in the metformin group as compared to the myo-inositol group. With metformin, it was more common to experience diarrhea, stomach cramps, flatulence, and overall weakness.

Limitations of the Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION AND RECOMMENDATION

Both methods of therapy showed a noticeable improvement in BMI, menstrual cycle, clinical parameters, and pregnancy outcome for PCOS. However, when comparing the two groups, only some discernible differences were seen in most data. Still, myoinositol is more effective in treating insulin resistance and androgen levels and has fewer adverse effects. Thus, myoinositol can also be used as an alternative to metformin to treat PCOS. Further study with a larger sample size is required to confirm the role of myoinositol as a sole insulin sensitizer.

REFERENCES

1. Azziz, R., Carmina, E., Dewailly, D., Diamanti-Kandarakis, E., Escobar-Morreale, H. F., Futterweit, W., ... & Witchel, S. F. (2006). Criteria for defining polycystic ovary syndrome as a predominantly hyperandrogenic syndrome: an androgen excess society guideline. *The Journal of Clinical Endocrinology & Metabolism*, *91*(11), 4237-4245.
2. Teede, H., Deeks, A., & Moran, L. (2010). Polycystic ovary syndrome: a complex condition with psychological, reproductive and metabolic manifestations that impacts on health across the lifespan. *BMC medicine*, *8*(1), 1-10.
3. Aversa, A., La Vignera, S., Rago, R., Gambineri, A., Nappi, R. E., Calogero, A. E., & Ferlin, A. (2020). Fundamental concepts and novel aspects of polycystic ovarian syndrome: expert consensus resolutions. *Frontiers in endocrinology*, *11*, 516.
4. Usadi, R. S., & Legro, R. S. (2012). Reproductive impact of polycystic ovary syndrome. *Current Opinion in Endocrinology, Diabetes and Obesity*, 19(6), 505-11.
5. Moran, L., Gibson-Helm, M., Teede, H., & Deeks, A. (2010). Polycystic ovary syndrome: a biopsychosocial understanding in young women to improve knowledge and treatment options. *Journal of Psychosomatic Obstetrics & Gynecology*, *31*(1), 24-31.
6. Deeks, A. A., Gibson-Helm, M. E., Paul, E., & Teede, H. J. (2011). Is having polycystic ovary syndrome a predictor of poor psychological function including anxiety and depression?. *Human Reproduction*, 26(6), 1399-407.
7. Teede, H. J., Misso, M. L., Costello, M. F., Dokras, A., Laven, J., Moran, L., Piltonen, T., & Norman, R. J. (2018). Recommendations from the international evidence-based guideline for the assessment and management of polycystic ovary syndrome. *Human reproduction*, 33(9), 1602-18.
8. Tehrani, F. R., Simbar, M., Tohidi, M., Hosseinpanah, F., & Azizi, F. (2011). The prevalence of polycystic ovary syndrome in a community sample of Iranian population: Iranian PCOS prevalence study. *Reproductive Biology and Endocrinology*, *9*(1), 1-7.
9. Norman, R. J., Dewailly, D., Legro, R. S., & Hickey, T. E. (2007). Polycystic ovary syndrome. *Lancet*, 370, 685–97.
10. Baillargeon, J. P., Iuorno, M. J., & Nestler, J. E. (2003). Insulin sensitizers for polycystic ovary syndrome. *Clinical obstetrics and gynecology*, *46*(2), 325-340.
11. Velazquez, E. M., Mendoza, S., Hamer, T., Sosa, F., & Glueck, C. J. (1994). Metformin therapy in polycystic ovary syndrome reduces hyperinsulinemia, insulin resistance, hyperandrogenemia, and systolic blood pressure, while facilitating normal menses and pregnancy. *Metabolism*, *43*(5), 647-654.
12. Nestler, J. E., & Jakubowicz, D. J. (1997). Decreases in ovarian cytochrome P450c17 alpha activity and serum free testosterone after reduction of insulin secretion in polycystic ovary syndrome. *Obstetrical & gynecological survey*, 52(2), 112-4.
13. Nestler, J. E., Stovall, D., Akhter, N., Iuorno, M. J., & Jakubowicz, D. J. (2002). Strategies for the use

of insulin-sensitizing drugs to treat infertility in women with polycystic ovary syndrome. *Fertility and sterility*, *77*(2), 209-215.
14. Glueck, C. J., Wang, P., Fontaine, R. N., Sieve-Smith, L., Tracy, T., & Moore, S. K. (1999). Plasminogen activator inhibitor activity: an independent risk factor for the high miscarriage rate during pregnancy in women with polycystic ovary syndrome. *Metabolism*, *48*(12), 1589-1595.
15. Jakubowicz, D. J., Iuorno, M. J., Jakubowicz, S., Roberts, K. A., & Nestler, J. E. (2002). Effects of metformin on early pregnancy loss in the polycystic ovary syndrome. *The Journal of Clinical Endocrinology & Metabolism*, 87(2), 524-9.
16. Palomba, S., Falbo, A., Zullo, F., & Orio, Jr. F. (2009). Evidence-based and potential benefits of metformin in the polycystic ovary syndrome: a comprehensive review. *Endocrine Reviews*, 30(1), 1-50.
17. Bargiota, A., & Diamanti-Kandarakis, E. (2012). The effects of old, new and emerging medicines on metabolic aberrations in PCOS. *Therapeutic advances in endocrinology and metabolism*, 3(1), 27-47.
18. Zheng, X., Lin, D., Zhang, Y., Lin, Y., Song, J., Li, S., & Sun, Y. (2017). Inositol supplement improves clinical pregnancy rate in infertile women undergoing ovulation induction for ICSI or IVF-ET. *Med*, 96, e8842.
19. Genazzani, A. D., Prati, A., Santagni, S., Ricchieri, F., Chierchia, E., Rattighieri, E., Campedelli, A., Simoncini, T., & Artini, P. G. (2012). Differential insulin response to myo-inositol administration in obese polycystic ovary syndrome patients. *Gynecological Endocrinology*, 28(12), 969-73.
20. Kapral, M., Sośnicki, S., Wawszczyk, J., & Węglarz, L. (2014). Influence of inositol hexaphosphate on the expression of selected proliferation markers in IL-1β-stimulated intestinal epithelial cells. *Acta Poloniae Pharmaceutica*, 71(6), 987-93.
21. Genazzani, A. D., Lanzoni, C., Ricchieri, F., & Jasonni, V. M. (2008). Myo-inositol administration positively affects hyperinsulinemia and hormonal parameters in overweight patients with polycystic ovary syndrome. *Gynecological Endocrinology*, 24(3), 139-44.
22. Gerli, S., Papaleo, E., Ferrari, A., & Di Renzo, G. C. (2007). Randomized, double blind placebo-controlled trial: effects of myo-inositol on ovarian function and metabolic factors in women with PCOS. *Eur Rev Med Pharmacol Sci*., 11(5), 347-54.
23. Thomas, R. M., Nechamen, C. A., Mazurkiewicz, J. E., Ulloa-Aguirre, A., & Dias, J. A. (2011). The adapter protein APPL1 links FSH receptor to inositol 1, 4, 5-trisphosphate production and is implicated in intracellular Ca2+ mobilization. *Endocrinology*, 152(4), 1691-701.
24. Ijuin, T., & Takenawa, T. (2012). Regulation of insulin signaling and glucose transporter 4 (GLUT4) exocytosis by phosphatidylinositol 3, 4, 5-trisphosphate (PIP3) phosphatase, skeletal muscle, and kidney enriched inositol polyphosphate phosphatase (SKIP). *Journal of Biological Chemistry*, 287(10), 6991-9.
25. Agrawal, A., Mahey, R., Kachhawa, G., Khadgawat, R., Vanamail, P., & Kriplani, A. (2019). Comparison of metformin plus myoinositol vs metformin alone in PCOS women undergoing ovulation induction cycles: randomized controlled trial. *Gynecological Endocrinology*, *35*(6), 511-514.
26. Fruzzetti, F., Perini, D., Russo, M., Bucci, F., & Gadducci, A. (2017). Comparison of two insulin sensitizers, metformin and myo-inositol, in women with polycystic ovary syndrome (PCOS). *Gynecological Endocrinology*, 33(1), 39-42.
27. Homburg, R. (1996). Polycystic ovary syndrome—from gynaecological curiosity to multisystem endocrinopathy. *Human Reproduction*, 11(1), 29-39.
28. Gambinineri, A., Pelusi, C., Vicennati, V., Pagotto, U., & Pasquali, R. (2002). Obesity and the polycystic ovary syndrome. *Int J Obes Relat Metab Disord*, 26(7), 883-96.
29. Carmina, E. (2006). Metabolic syndrome in polycystic ovary syndrome. *Minerva Ginecologica*, 58(2), 109–114.
30. Sivalingam, V. N., Myers, J., Nicholas, S., Balen, A. H., & Crosbie, E. J. (2014). Metformin in reproductive health, pregnancy and gynaecological cancer: established and emerging indications. *Human reproduction update*, 20(6), 853-68.
31. Nehra, J., Kaushal, J., Singhal, S. R., & Ghalaut, V. S. (2017). Comparision of myo-inositol versus metformin on anthropometric parameters in polycystic ovarian syndrome in women. *Education*, 11(22), 8.
32. Prabhakar, P., Mahey, R., Gupta, M., Khadgawat, R., Kachhawa, G., Sharma, J. B., Vanamail, P., Kumari, R., & Bhatla, N. (2021). Impact of myoinositol with metformin and myoinositol alone in infertile PCOS women undergoing ovulation induction cycles-randomized controlled trial. *Gynecological Endocrinology*, 37(4), 332-6.
33. Angik, R., Jajoo, S. S., Hariharan, C., & Chimote, A. (2015). A comparative study of metabolic and hormonal effects of myoinositol vs. metformin in women with polycystic ovary syndrome: a randomised controlled trial. *Int J Reprod Contracept Obstet Gynecol*., 4(1), 189-94.
34. De Leo, V., Musacchio, M. C., Cappelli, V., Di Sabatino, A., Tosti, C., & Leo, P. P. (2013). A combined treatment with myo-inositol and monacolin k improve the androgen and lipid profiles of insulin-resistant PCOS patients. *J Metabolic Synd*, 2(127), 2167-0943.

35. Shokrpour, M., Foroozanfard, F., Afshar Ebrahimi, F., Vahedpoor, Z., Aghadavod, E., Ghaderi, A., & Asemi, Z. (2019). Comparison of myo-inositol and metformin on glycemic control, lipid profiles, and gene expression related to insulin and lipid metabolism in women with polycystic ovary syndrome: a randomized controlled clinical trial. *Gynecological Endocrinology*, 35(5) 406-11.
36. Jamilian, M., Farhat, P., Foroozanfard, F., Afshar Ebrahimi, F., Aghadavod, E., Bahmani, F., Badehnoosh, B., Jamilian, H., & Asemi, Z. (2017). Comparison of myo-inositol and metformin on clinical, metabolic and genetic parameters in polycystic ovary syndrome: a randomized controlled clinical trial. *Clinical Endocrinology*, 87(2), 194-200.
37. Tagliaferri, V., Romualdi, D., Immediata, V., De Cicco, S., Di Florio, C., Lanzone, A., & Guido, M. (2017). Metformin vs myoinositol: which is better in obese polycystic ovary syndrome patients? A randomized controlled crossover study. *Clinical Endocrinology*, 86(5), 725-30.
38. Nehra, J., Kaushal, J., Singhal, S. R., & Ghalaut, V. S. (2016). A comparative study of efficacy and safety of myo-inositol versus metformin in polycystic ovarian syndrome in women. *World Journal of Pharmacy and Pharmaceutical Sciences*, 5(5), 884-96.

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