Impact of Metformin on Quality of Life in Polycystic Ovary Syndrome: A Systematic Literature Review

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CONCLUSION

Findings of this review suggest that both metformin monotherapy and its combination therapies significantly improve QoL in patients with PCOS. These findings contribute to the growing body of evidence advocating for the use of metformin-based therapies to address QoL issues in PCOS patients. This review adds to the growing body of evidence supporting the use of metformin-based therapies as an effective strategy for improving QoL in PCOS.

INTRODUCTION

- Polycystic ovary syndrome (PCOS) is a prevalent endocrine disorder affecting the quality of life (QoL) in women of reproductive age (1,2)
- Women with PCOS face a greater risk of depression, anxiety, and lowered self-esteem compared to those without the condition (3)
- Effectively managing PCOS symptoms, can help alleviate these psychological challenges and enhance overall quality of life (3,4)
- Metformin and its combination therapies are being increasingly used to improve metabolic function and regulate menstrual cycles in the management of PCOS (1-5)

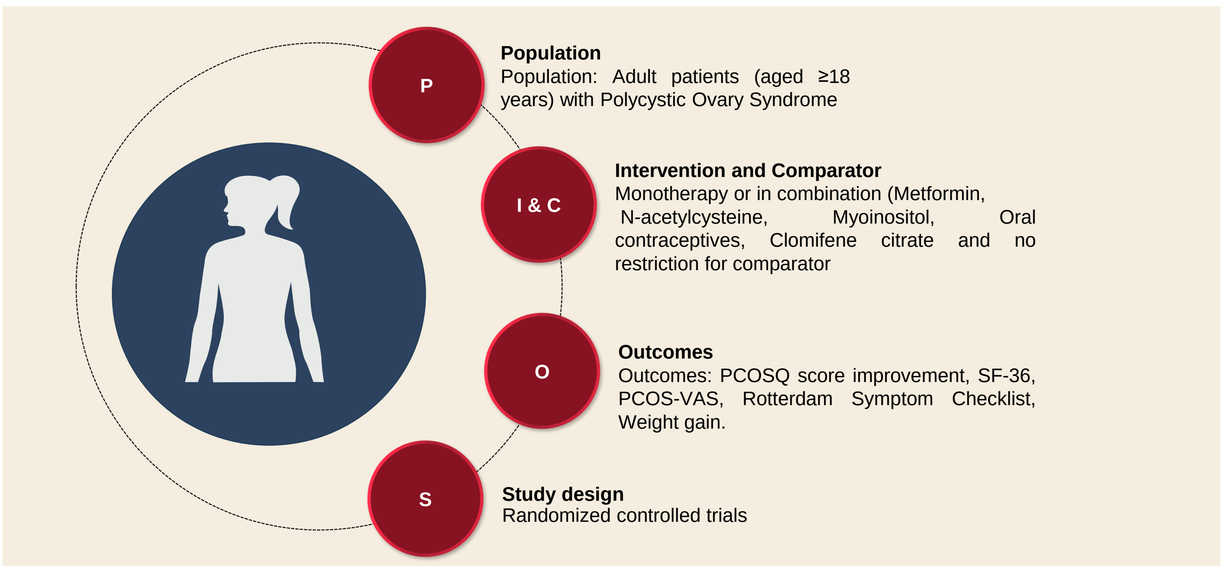
OBJECTIVE

- The systematic literature review (SLR) aims to assess the impact of metformin monotherapy or its combination therapy on QoL in women with PCOS

METHODS

- Key biomedical databases (Embase® and Medline®) were searched from database inception to May 2024 to identify randomized controlled trials (RCTs) that met the prespecified eligibility criteria as given in **Figure 1**
- Bibliographic searching was conducted to supplement the evidence base
- Title, abstract, full-text screening and structured data extraction were conducted independently in duplicate by two reviewers

Figure 1: Prespecified PICOS eligibility criteria for the selection of evidence

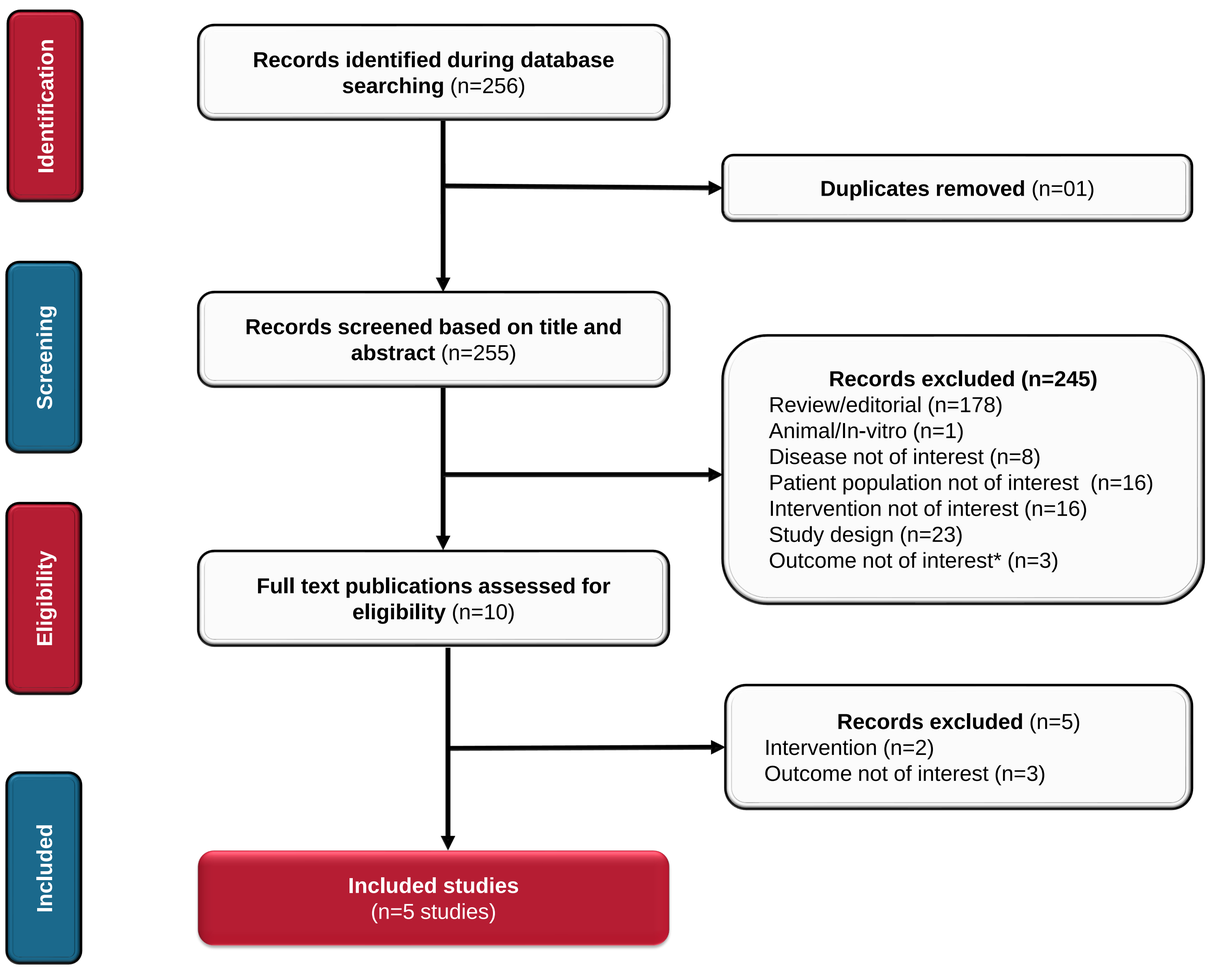


PCOSQ: Polycystic Ovary Syndrome Questionnaire; PCOS-VAS: Polycystic Ovary Syndrome-Visual Analog Scale; SF-36: Short form-36

RESULTS

- A total of 256 publications were screened, of which five RCTs assessing the impact of metformin on the QoL were included as depicted in **Figure 2**
- The QoL scales utilized across the included evidence were the Polycystic Ovary Syndrome Questionnaire (PCOSQ, n=2), Short Form-36 (SF-36, n=2), Polycystic ovarian syndrome-Visual Analog Score1-6 (PCOS-VAS1-6, n=1), and Rotterdam Symptom Checklist (RSCL, n=1) **(Figure 3)**

Figure 2. PRISMA diagram for the screening process



RESULTS (Cont'd)

Figure 3: List of QOL scales used across various studies.

PCOSQ: Polycystic Ovary Syndrome Questionnaire; PCOS-VAS: Polycystic Ovary Syndrome-Visual Analog Scale; RSCL: Rotterdam Symptom Checklist; SF-36: Short form-36

- Metformin-based combination treatment was assessed in three studies, while two assessed metformin monotherapy
- At 6 months, compared to metformin monotherapy, significantly higher PCOSQ scores (**Figure 4A**) among women treated with either combination of metformin + myoinositol + D-chiro-inositol ($p<0.001$) or N-acetylcysteine ($p<0.05$) was observed in two studies
- The PCOS-VAS1 scale, which specifically measures facial hair (hirsutism), showed a significant reduction in scores at 12 months for both oral contraceptives (OCP) and the combination of metformin + oral contraceptives (MOCP), suggesting an improvement in quality of life (QoL) for patients. This decrease in PCOS-VAS1 scores indicates that OCP and MOCP were more effective than metformin monotherapy in addressing this symptom **(Figure 4C)**. However, when analyzing the scores on the PCOS-VAS 2-6, the differences between the three intervention groups were minimal and not statistically significant
- Conversely, as shown in **Figure 4B** combination of metformin + clomifene citrate (CC) patients reported poor QoL as indicted with higher RSCL scores at 16 weeks compared to CC group
- SF-36 scores were similar across metformin monotherapy, myoinositol, OCP, and MOCP treatment groups indicating comparable QoL as shown in **Table 1**

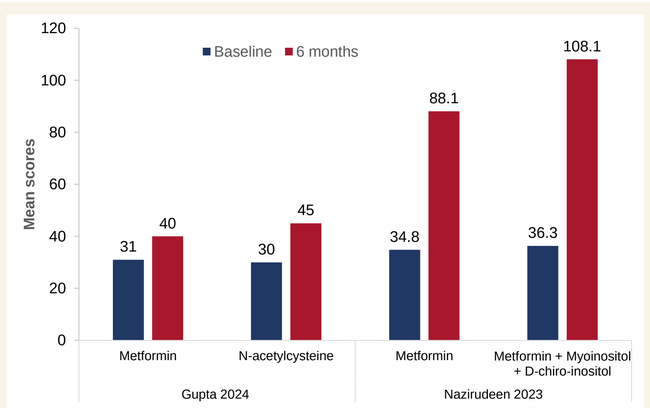


Figure 4 (A): Changes in PCOSQ scores at baseline and 6 months

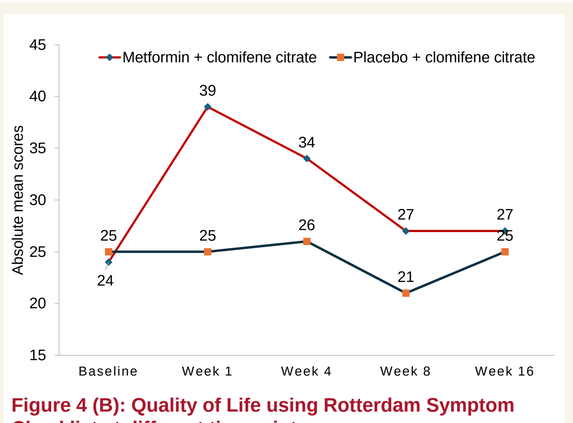


Figure 4 (B): Quality of Life using Rotterdam Symptom Checklist at different timepoints

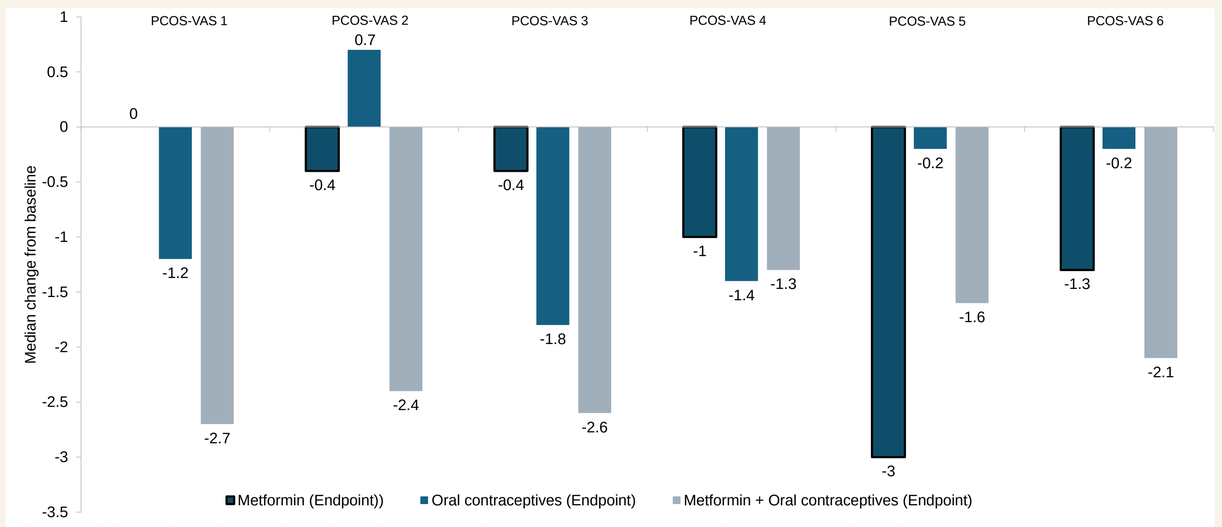


Figure 4 (C): Median change from baseline at month 12 using PCOS-VAS scale across six domains

PCOSQ: Polycystic Ovary Syndrome Questionnaire; PCOS-VAS: Polycystic Ovary Syndrome-Visual Analog Scale; RSCL: Rotterdam Symptom Checklist; SF-36: Short form-36

Table 1. Median absolute and change from baseline scores on SF-36 scale

Short Form-36 domains	Altinok 2018			Ravn 2022			
				Baseline		6 months	
	Metformin	Oral contraceptives	Metformin + Oral contraceptives	Myoinositol	Metformin	Myoinositol	Metformin
Physical function	0	0	0	90	90	90	95
Role limitations physical	0	0	0	88	100	100	100
Bodily pain	0	0	0	--	--	--	--
General health	5	-3	0	65	58	63	68
Vitality	5	-3	0	--	--	--	--
Social function	0	0	0	59	53	69	64
Role limitations emotional	0	0	0	100	100	100	100
Mental health	-2	-6	0	--	--	--	--
Summed physical scores	-1	0	2	--	--	--	--
Summed mental scores	1	-2	-2	--	--	--	--
Pain	--	--	--	58	74	68	69
Emotional well-being	--	--	--	74	72	80	70
Energy/fatigue	--	--	--	50	40	53	48

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Disclosures

VS, MAA, PR, SA, BS, authors declare that they have no conflict of interest.