

1 **Table S1 The systematic literature review search strategy**

Database	Search strategy
Pubmed (up to Nov 2024):140	("ferroptosis"[MeSH Terms] OR "ferroptosis"[Title/Abstract] OR "oxytosis"[Title/Abstract] OR "iron"[Title/Abstract] OR "ferritin"[Title/Abstract] OR "ferritins"[Title/Abstract] OR "transferrin saturation"[Title/Abstract] OR "hepcidin"[Title/Abstract] OR "hepcidins"[Title/Abstract]) AND ("polycystic ovary syndrome"[MeSH Terms] OR "polycystic ovary syndrome"[Title/Abstract] OR "polycystic ovarian syndrome"[Title/Abstract] OR "Stein-Leventhal syndrome"[Title/Abstract] OR "Stein Leventhal syndrome"[Title/Abstract] OR "sclerocystic ovarian degeneration"[Title/Abstract] OR "sclerocystic ovary syndrome"[Title/Abstract] OR "polycystic ovary"[Title/Abstract] OR "sclerocystic ovaries"[Title/Abstract] OR "PCOS"[Title/Abstract])
Embase (up to Nov 2024) (Elsevier Embase.com): 247	('ferroptosis'/exp OR 'ferroptosis':ti,ab OR 'oxytosis':ti,ab OR 'iron':ti,ab OR 'ferritin':ti,ab OR 'ferritins':ti,ab OR 'transferrin saturation':ti,ab OR 'hepcidin':ti,ab OR 'hepcidins':ti,ab) AND ('polycystic ovary syndrome'/exp OR 'polycystic ovary syndrome':ti,ab OR 'polycystic ovarian syndrome':ti,ab OR 'stein leventhal syndrome':ti,ab OR 'sclerocystic ovarian degeneration':ti,ab OR 'sclerocystic ovary syndrome':ti,ab OR 'polycystic ovary':ti,ab OR 'sclerocystic ovaries':ti,ab OR 'pcos':ti,ab)
Web of Science (All Databases) (up to Nov 2024): 235	(((TS=(ferroptosis)) OR (AB=(ferroptosis OR oxytosis OR iron OR ferritin OR ferritins OR "transferrin saturation" OR hepcidin OR hepcidins)) OR (TI=(ferroptosis OR oxytosis OR iron OR ferritin OR ferritins OR "transferrin saturation" OR hepcidin OR hepcidins))) AND ((TS=("polycystic ovary syndrome")) OR (TI=("polycystic ovary syndrome" OR "polycystic ovarian syndrome" OR "Stein-Leventhal syndrome" OR "Stein Leventhal syndrome" OR "sclerocystic ovarian degeneration" OR "sclerocystic ovary syndrome" OR "polycystic ovary" OR "sclerocystic ovaries" OR PCOS)) OR (AB =("polycystic ovary syndrome" OR "polycystic ovarian syndrome" OR "Stein-Leventhal syndrome" OR "Stein Leventhal syndrome" OR "sclerocystic ovarian degeneration" OR "sclerocystic ovary syndrome" OR "polycystic ovary" OR "sclerocystic ovaries" OR PCOS))))

3 **Table S2 Quantitative Real-Time PCR Primers for Gene Expression Analysis**

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Gene Name & Primer Direction	Primer Sequence
GAPDH-Homo-Forward	CAAATTCCATGGCACCGTCA
GAPDH-Homo-Reverse	GATGGCATGGACTGTGGTCA
TP53-Homo-Forward	ACCTATGGAACTACTTCCTGAAA
TP53-Homo-Reverse	CTCCGTCATGTGCTGTGACT
NCOA4-Homo-Forward	CCCAGTTGACCACTTTTGCTC
NCOA4-Homo-Reverse	CGCTGAAAGGGACAGCTACA
GPX4-Homo-Forward	CAGTGAGGCAAGACCGAAGT
GPX4-Homo-Reverse	CGGTGTCCAACTTGGTGAAG
SCL7A11-Homo-Forward	TCCATGAACGGTGGTGTGTT
SCL7A11-Homo-Reverse	GCACCTTGAAAGGACGATGC
ACSL4-Homo-Forward	TGCTGCCTGTCCACTTGTTA
ACSL4-Homo-Reverse	TAGCACATGAGCCAAAGGCA
FTH1-Homo-Forward	AGCTCTACGCCTCCTACGTT
FTH1-Homo-Reverse	GCTCTCCCAGTCATCACAGTC

5 Table S3 Quality assessment based on NOS

Study	Selection				sc	Comp			Sc	N	
					or	arabil	Outcome/Exposure		or	O	
					e	ty					
					Comp						
					arabili						
					ty of						
					Same						
					Cases						
					metho						
					d of						
					ascert						
					Non-R						
					espons						
					e rate						
					cases						
					and						
					contro						
					ls						
					Desig						
					n or						
					Analy						
					sis						
Case-co											
Adamska A,	ntrol										
2020[22]	study	★	★		★	3	★★★	★	★	★	3 8
Al-Akabi	Case-co										
DF,	ntrol										
2023[23]	study	★			★	2	★★★	★	★	★	3 7
Al-Hakeim	Case-co										
HK,	ntrol										
2012[24]	study	★			★	2	★★★	★	★	★	3 7
Alvarez-Bla	Case-co										
sco F,	ntrol										
2009[25]	study	★			★	2	★★★	★	★	★	3 7

Ayonrinde OT,	Cross-sectional study	★	★	★	★	4	★★★	★	★		2	8
Başar Gökçen B,	Case-control study	★			★	2	★★★	★	★	★	3	7
Escobar-Morreale HF,	Case-control study	★			★	2	★★★	★	★	★	3	7
Gözdemiş E,	Prospective study	★			★	2	★★★	★	★	★	3	7
Hosseini Rashidi B,	Case-control study	★	★		★	3	★★★	★	★	★	3	8
Insenser M,	Case-control study	★			★	2	★★★	★	★	★	3	7
Jihad A,	Case-control study	★	★		★	3	★★★	★	★	★	3	8
Kim JW,	Case-control study	★			★	2	★★★	★	★	★	3	7
Li M,	Cross-sectional study	★	★	★	★	4	★★★	★	★	★	3	9
Luque-Ramírez M,	Case-control study	★		★	★	3	★★★	★	★	★	3	8

Luque-Ramírez M,	Case-control study	★	★		★	3	★★★	★	★	★	3	8
	Case-control study	★	★									
Palomba S,	Control study	★	★	★	★	4	★★★	★	★	★	3	9
	Case-control study	★			★	2	★★★	★	★	★	3	7
Saadi RK,	Control study	★			★	2	★★★	★		★	2	6
	Case-control study	★			★	2	★★★	★	★	★	3	7
Sam AH,	Control study	★			★	2	★★★	★		★	2	6
	Case-control study	★			★	2	★★★	★	★	★	3	7
Sharma P,	Control study	★			★	2	★★★	★	★	★	3	7
	Cross-sectional study	★	★		★	3	★★★	★	★	★	3	7
Yang JH,	Prospective study	★			★	2	★★★	★	★	★	3	7
Yildir IC,	Case-control study	★			★	2	★★★	★	★	★	3	7
	Case-control study	★			★	2	★★★	★	★	★	3	8
Yin D,	Control study	★			★	2	★★★	★	★	★	3	8

Table S4 Serum ferritin, serum iron, serum hepcidin and TSAT levels of PCOS and control groups

Study	Ferritin			Iron			Hepcidin			TSAT		
	Unit	PCOS	Control	Unit	PCOS	Control	Unit	PCOS	Control	Unit	PCOS	Control
Adamska A, 2020[22]	ng/ml	31.1 ± 22.4	47.3 ± 30.6									
Al-Akabi DF, 2023[23]	μg/l	155.0 ± 82.23	41.97 ± 26.35	μm	179.54 ± 51.8	81.81 ± 35.02	μm	1.37 ± 1.27	6.62 ± .85			
Al-Hakeim HK, 2012[24]	pmol/l	391.1 ± 248.2	164.3 ± 115.4	μm	22.17 ± 10.52	17.86 ± 6.32				%	55.04 ± 31.64	42.83 ± 38.28
Alvarez-Blasco F, 2009[25]	pmol/l	121 ± 101	79 ± 46									
Ayonrinde OT, 2016[26]	μg/l	45.34 ± 34.37	38.96 ± 32.96									
Başar Gökçen B, 2021[27]	ng/ml	kg/m2: 23.70 ± 19.35	kg/m2: 15.18 ± 9.12	pg/ml	5 kg/m2: 88.88 ± 46.00	25 kg/m2: 111.05 ± 33.4						

	BMI≥	BMI≥											
	25	25		BMI≥2	BMI≥								
	kg/m2	kg/m2		5	25								
	:	:		kg/m2:	kg/m2:								
	27.63	19.39		58.34 ±	102.55								
	± 20.9	± 14.9		23.14	± 45.8								
	7	8											
Escobar-Morr	ng	52	38										
eale HF,	/m	(44–6	(33–4										
2011[28]	l	1) ^a	3) ^a										
Gözdemir E,	ng	28.11	23.82			61.65	ng	67.00					
2013[29]	/m	±	±	μg	72.83 ±	±	/m	±17.1	72.00±	%	20.14	16.81	
	l	14.71	13.68	/dl	34.62	27.59	l	3	21.96		± 9.16	±8.49	
Hossein	ng	62.62	71.81			70.62	pg						
Rashidi B,	/m	± 42.1	± 100.	μg	72.89 ±	± 31.1	/m	1.97 ±	2.40 ±				
2017[30]	l	8	26	/dl	28.97	8	l	0.53	0.25				
Insenser M,	ng	57 ±	43 ±										
2010[31]	/m	62	39										
Jihad A,	ng	279.9	129.1	g/	223.5±	129.1±	ng	13.27	98.76±				
2023[32]	/m	±44.9	±44.9	dl	57.3	44.9	/m	±1.46	2.88				
	l						l						
Kim JW,	ng	64.54	39.14			76.31	ng				32.52	25.92	
2014[33]	/m	±	±	μg	101.42	±	/m	9.36 ±	5.74 ±	%	±	±	
	l	38.41	28.57	/dl	± 41.66	31.38	l	6.25	3.90		14.57	12.26	
					6.61	6.60							
Li M,					(5.46–7	(5.63–							
2017[41]				m	.51) ^b	7.52) ^b							
				m	BMI<2	BMI<							
				m	5	25							

[illegible]

2015[39]	/m	(34.1–	(16.5–		
	l	108.0)	44.2) ^b		
		^b			
Yildir IC,	ng	33.23	19.25		
2013[40]	/m	± 27.2	± 10.6		
	l	8	8		
Yin D,				m	413.21 402.18
2024[43]				g/l	7±29.0 1±39.5
					83 83

Notes: ^aData were reported as means (95% confidence interval of the mean); ^bdata were reported median (25–75 % quartiles); ^cdata were reported as median (range). PCOS, polycystic ovary syndrome, BMI, body mass index.