Association between early menarche and endometriosis risk: a systematic review and meta-analysis

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Abstract

Background Early menarche is reported with the risk of endometriosis (EMS) with varying conclusions. Objective To assess the association between menarche age and EMS risk. Search strategy PubMed, Medline and Embase were searched using "endometriosis", "early menarche" , "EMS", "menarche age", and "early menstrual characteristics". Selection criteria Articles that reported the EMS risk in early menarche from Jan 2000 to May 2020 were included. Studies without control group, and lack of data of menarche age were excluded. Data collection and analysis EMS risks in these articles were collected and analysed through in random effects meta-analysis. In addition, subgroup analyses and meta-regressionwere were also performed. Main results A total of 16 studies (8913 EMS cases and 876477 controls) were included in the meta-analysis. The pooled risk of EMS in early menarche (<12 years) was 1.34 (95% CI: 1.16–1.54), with statistically significant heterogeneity across the studies (I2 = 72.0%). Stratified analysis showed that the risks of EMS by earlier menarche was increased in studies started after 2000, and in developing area, which was further confirmed by meta-regression analysis. In addition, higher quality in assessment of the exposure (menarche age) and control of potential confounders can elemenate heterogeneity. Conclusions The earlier age of menarche is a major risk factor of EMS, and its risk has an increasing trend in recent years and in developing countries. Large-scale studies in different ethnic groups are warranted.

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Identification

Records Pubmed
(n = 135)

Records Embase
(n = 194)

Records Medline
(n = 87)

Total records
(n=416)

Excluded
duplicates
(n = 298)

Screening

Records after duplicates
removed
(n = 118)

Excluded by
title and abstract
(n = 71)

Eligibility

Full-text articles
assessed for eligibility
(n = 47)

Full-text articles
excluded(n=34)
1)No controls
(n=4)
2)No enough data
(n=21)
3)Very small
population (<50
subjects)
(n=1)
4)Duplicate studies
(n=8)

Included

Included full-text
articles
(n =13)

Reference
and citation
tracking
(n =3)

Studies included in meta-
analysis
(n =16)

Author	Year of publication	Menarche age≥12		Menarche age<12		OR (95% CI)	% Weight
		Ctrl	EMS	Ctrl	EMS		
Bouzari	2016	279	102	19	17	2.45 (1.22, 4.89)	3.07
Burghaus	2011	266	243	26	48	2.02 (1.22, 3.36)	4.72
Flores	2008	726	32	482	25	1.18 (0.69, 2.01)	4.41
Gallagher	2018	144	201	59	159	1.93 (1.34, 2.79)	6.72
Johnson	2016	1353	77	177	7	0.69 (0.32, 1.53)	2.50
Kvaskoff	2013	60181	2040	15737	644	1.21 (1.10, 1.32)	11.96
Mamdouh	2011	195	86	25	24	2.18 (1.18, 4.03)	3.66
Matalliotakis	2008	145	372	25	113	1.76 (1.10, 2.83)	5.14
Missmer	2004	553859	1258	170059	455	1.18 (1.06, 1.31)	11.72
Mollazadeh	2019	306	131	64	54	1.97 (1.30, 2.99)	5.94
Peterson	2013	321	160	66	39	1.19 (0.76, 1.84)	5.61
Saha	2017	23595	1022	2932	170	1.34 (1.13, 1.58)	10.67
Templeman	2008	33961	179	9303	50	1.02 (0.74, 1.40)	7.68
Treloar	2010	209	207	31	61	1.99 (1.24, 3.19)	5.15
Buck Louis	2004	32	29	16	2	0.14 (0.03, 0.65)	0.76
Hemmings	2007	1402	697	482	209	0.87 (0.72, 1.05)	10.29
Overall (I-squared = 72.0%, p = 0.000)						1.34 (1.16, 1.54)	100.00

NOTE: Weights are from random effects analysis

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Author	Year of publication	Menarche age≥12		Menarche age<12		OR (95% CI)	% Weight
		Ctrl	EMS	Ctrl	EMS		
2							
Bouzari	2016	279	19	102	17	2.45 (1.22, 4.89)	3.07
Burghaus	2011	266	26	243	48	2.02 (1.22, 3.36)	4.72
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Buck Louis	2004	32	16	29	2	0.14 (0.03, 0.65)	0.76
Hemmings	2007	1402	482	697	209	0.87 (0.72, 1.05)	10.29
Subtotal (I-squared = 79.3%, p = 0.000)						1.45 (1.08, 1.94)	47.86
.							
1							
Gallagher	2018	144	59	201	159	1.93 (1.34, 2.79)	6.72
Johnson	2016	1353	177	77	7	0.69 (0.32, 1.53)	2.50
Kvaskoff	2013	60181	15737	2040	644	1.21 (1.10, 1.32)	11.96
Missmer	2004	553859	170059	1258	455	1.18 (1.06, 1.31)	11.72
Mollazadeh	2019	306	64	131	54	1.97 (1.30, 2.99)	5.94
Peterson	2013	321	66	160	39	1.19 (0.76, 1.84)	5.61
Templeman	2008	33961	9303	179	50	1.02 (0.74, 1.40)	7.68
Subtotal (I-squared = 59.4%, p = 0.022)						1.26 (1.10, 1.46)	52.14
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Overall (I-squared = 72.0%, p = 0.000)						1.34 (1.16, 1.54)	100.00

NOTE: Weights are from random effects analysis

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