Web Appendix 1: Study Quality Checklist

Guideline		Checklist				
1. Study design appropriate to objectives?		Objective	Common design			
		Prevalence	Cross-sectional			
		Prognosis	Cohort			
		Treatment	Controlled trial			
		Cause	Cohort, case-control, cross- sectional			
2.	Study sample representative?	Source of sample				
		Sampling method				
		Sample size				
		Entry criteria/exclusions				
		Nonrespondents				
3.	Control group acceptable?	Definition of contro	bls			
		Source of controls				
		Matching/randomiz	zation			
		Comparable chara	cteristics			
4.	Quality of measurement and outcomes?	Validity				
		Reproducibility				
		Blindness				
		Quality control				
5.	Completeness?	Compliance				
		Drop outs				
		Deaths				
		Missing data				
6.	Distorting influences?	Extraneous treatm	ents			
•••		Contamination				
		Changes over time	9			
		Confounding facto	rs			
		Distortion reduced	by analysis			
++ = Major problem, + = Minor problem, 0 = No problem, NA = Not applicable						

Guidelines and checklist for appraising a medical article

Source: Fowkes FG, Fulton PM. Critical appraisal of published research: introductory guidelines. BMJ (Clinical research ed). 1991 May 11;302(6785):1136–1140.

Study ID, Country	Population	Prevalence/incidence ^a	Primary outcome	Significant risk factors	Effect estimates	Confidence interval ^b / p value			
Longitudinal study									
Ohde et al (2008)	823 randomly sampled	ampled Incidence: 15.8%:(95% CI 3-51 years 13.3, 18.3) onth	Presence of dysmenorrhea	Age <30 years	RR 2.25	1.50, 3.37			
(1) Japan	women aged 18-51 years Follow-up: 1 month			Employed	RR 1.62	1.10, 2.40			
Wang et al (2004) (2)	388 female textile workers, aged 20-34 years and	Incidence: 28% Prevalence: 44.4%	Presence of dysmenorrhea	Self-perceived stress during preceding cycle (vs low stress)					
China	nulliparous			High stress	OR 2.4	1.4, 4.3			
				High stress + dysmenorrhea in preceding cycle	OR 3.6	1.7, 7.8			
Weissman et al (2004) (3)	404 nursing students or graduates with primary dysmenorrhea, aged ≥19years	Primary: 75% (mild 53%, moderate 20%, severe 2%)	Moderate-severe primary dysmenorrhea	Parity (increment of 1 birth)	OR 0.70	0.54, 0.91			
USA				Age (increment of 1 year)	OR 0.94	0.90, 0.99			
	Follow-up: 6 years								
Community-based cr	oss-sectional study	1	1			1			
Abenhaim &	904 women not using OCP, aged 36-44 years	36.7%	Moderate-severe pain	Livebirth (vs 0)					
Hallow (2000) (4) USA				1	OR 0.4	0.3, 0.7			
				2	OR 0.4	0.2, 0.6			
				3+	OR 0.3	0.2, 0.5			
Burnett et al	1546 menstruating women from a stratified random sample, aged ≥18 years	Primary: 60% Limiting activity: 15% with mild & 51% with moderate- severe pain	Presence of primary dysmenorrhea	Age	β=-0.96	p<0.001			
(2005) (5) Canada				Smoking	β=1.30	p=0.046			
ounduu				Oral contraception pills	β=-0.72	p=0.017			
Harlow et al (2002)	976 women with intact uteri, aged 36-44 years	NR	Cycle pain change from the 1st 5 years after menarche to late reproductive years	Tubal ligation					
(6) LISA				Became better (vs no change)	OR 0.9	0.5, 1.5			
USA				Became worse (vs no change)	OR 1.4	0.8, 2.4			
				Tubal ligation > 5 years ago					
				Became better (vs no change)	OR 1.1	0.6, 2.2			

Web Appendix 2: Summary of Included Primary Studies on Risk Factors for Dysmenorrhea

Study ID, Country	Population	Prevalence/incidence ^a	Primary outcome	Significant risk factors	Effect estimates	Confidence interval ^b / p value
				Became worse (vs no change)	OR 1.9	0.9, 4.1
Laszlo et al. (2008)	2722 working women from a	a 15.5% with painful menstruation limiting activity	Presence of dysmenorrhea	Work stress measured by		
(7) Hungary	ration-wide representative random sample, aged <55		limiting activity	Control at workplace (vs none)		
langury	years			Medium	OR 0.67	0.49, 0.91
				High	OR 0.66	0.47, 0.95
				Co-worker-support (vs none)		
				Medium	OR 0.62	0.46, 0.83
				High	OR 0.51	0.35, 0.76
				High job security (vs low)	OR 0.63	0.42, 0.95
Laszlo et al. (2009)) 821 pre-menopausal, non- pregnant working women, mean age about 38 years	20.1% painful menstruation limiting activity	Presence of dysmenorrhea limiting activity	Work stress measured by		
(8) Hungary				Effort-reward imbalance	OR 1.42	1.03, 1.94
Thungary				Over commitment	OR 1.07	1.02, 1.13
Nohara et al.	2166 Japanese female workers who are menstruating	78.3% (2.8% very serious pain, 25.8% serious pain, 49.7% tolerable pain)	Severe-very severe pain	Age (increment of 1 year)	OR 0.94	0.93, 0.96
(2011) (9) Japan				BMI (vs 18.5-25 kg/m ²)	OR 1.42	1.12, 1.80
oupun				Parity (vs 0)	OR 0.70	0.52, 0.94
				Stress (vs no/very little/somewhat stress):	OR 1.46	1.13, 1.87
Patel et al. (2006)	2262 randomly selected women, aged 18-45 years not on OCP	54.7% (mild 21.3% (95% CI 19.6, 23.0), moderate to severe 33.4% (95% C:I 31.4,	Moderate-severe pain	Age (vs 18-24 years), p<0.001		
(10) India				30-34	OR 0.54	0.4, 0.8
mana		35.5)		34-40	OR 0.46	0.3, 0.7
				40-50	OR 0.43	0.3, 0.6
				Age at menarche (vs ≤12 years), P=0.01		
				13-14	OR 0.75	0.6, 0.9
				15+	OR 0.70	0.5, 0.9
				Ever pregnant	OR 0.53	0.4, 0.7

Study ID, Country	Population	Prevalence/incidence ^a	Primary outcome	Significant risk factors	Effect estimates	Confidence interval ^ь / p value
				Menorrhagia	OR 1.92	1.4, 2.6
				Somatoform symptom score ^c (vs 0- 1), p<0.001		
				2-3	OR 1.21	0.9, 1.6
				4-7	OR 2.63	2.0, 3.4
				>7	OR 3.67	2.7, 4.9
				Violence from others	OR 2.23	1.5, 3.4
Pawlowski (2004) (11) Mexico	177 non-smoking women living in the Mayan village, aged 18-45 years	28%	Presence of dysmenorrhea	Age at birth of first child	OR 1.15	1.02, 1.30
Pitts et al. (2008)	1983 menstruating women	71.7%, among them 15% (95% CI 13.0, 17.1) severe pain	Presence of dysmenorrhea	Age (vs 40-49 years)		
(12) Australia	from a random sample, aged 16-49 vears, sexually active.			16-19	OR 2.74	1.49, 5.04
Australia	not been pregnant in the previous 12 months			20-29	OR 1.58	1.18, 2.12
				30-39	OR 1.49	1.18, 1.89
				English spoken (vs other)	OR 2.02	1.21, 3.38
				Even been pregnant	OR 0.74	0.55, 0.99
				Ever had a live birth	OR 0.74	0.56, 0.97
Santer et al.	2833 women, aged 25-	Severe pain 15% (95% CI 13-	Severe-very severe pain	Parity (per child, vs 0)	OR 0.87	0.77, 0.98
(2005) (13) LIK	44years not using IUCD, random sampled from 19 general practices	16), of which 2% very severe		Deprivation area (per unit increase)	OR 1.30	1.18, 1.43
U.V.				Longstanding illness	OR 1.73	1.33, 2.23
				Hormonal contraception (vs other excl IUCD)	OR 0.25	0.18, 0.35
Tavallaee et al.	276 women, aged 16-56 years not having secondary dysmenorrhea, from a stratified random sample	Primary: 91% (mild 41%, moderate 28%, severe 22%)	Presence of dysmenorrhea	Age	OR 0.91	0.79, 0.92
(2011) (14) Iran				SES (vs very low)		
				Less than average	OR 0.08	0.00, 0.80
				Average	OR 0.06	0.00, 0.70

Study ID, Country	Population	Prevalence/incidence ^a	Primary outcome	Significant risk factors	Effect estimates	Confidence interval ^ь / p value
				More than average	OR 0.05	0.00, 0.90
				Fruits & veg (vs never/low)		
				High	OR 0.40	0.20, 0.60
				Very high	OR 0.20	0.08, 0.50
				Depressed most of the time (vs never)	OR 13.3	2.0, 86.0
				Family history of dysmenorrhea	OR 3.8	2.20, 6.90
Unsal et al. (2010)	729 reproductive age women	63.6%	Presence of dysmenorrhea	No of birth (vs >3)		
(15) Turkev	physicians, aged 15-49 yrs,			0	OR 7.83	4.21, 14.57
Turkey				1-2	OR 2.33	1.32, 4.11
				Irregular menstruation	OR 1.90	1.22, 32.95
				Family history of dysmenorrhea	OR 20.73	11.48, 37.42
Systematic review						
Latthe et al (2006)	 64,286 women (from 63 studies) provided information on dysmenorrhea. No details on patients' characteristics were reported 	NR	Presence of dysmenorrhea	Age < 30 years (3 studies)	OR 1.89	1.36, 2.63
(16)				BMI < 20 kg/m ² (5 studies)	OR 1.42	1.26, 1.59
				High SES (2 studies)	OR 1.25	1.04, 1.50
	Note that all multiple studies			Smoking (11 studies)	OR 1.37	1.19, 1.57
	are reported to be			Fish intake (1 study)	OR 0.37	0.18, 0.73
	lieleiogeneous			Exposure to cold at work (2 studies)	OR 2.20	1.31, 3.70
				Slaughterhouse work (1 study)	OR 2.54	1.33, 4.86
				Textile mill work (1 study)	OR 2.05	1.30, 3.24
				Earlier menarche (6 studies)	OR 1.54	1.17, 2.04
				More pregnancies/parity (12 studies)	OR 0.64	0.57, 0.72
				Age at birth of first child (1 study)	OR 0.38	0.18, 0.83
				Miscarriage (4 studies)	OR 1.29	1.05, 1.59

Study ID, Country	Population	Prevalence/incidence ^a	Primary outcome	Significant risk factors	Effect estimates	Confidence interval ^ь / p value
				Irregular menses (2 studies)	OR 2.02	1.19, 3.44
				Duration of menstrual flow (5 studies)	OR 2.38	1.69, 3.3.7
				Heavy menstrual blood loss (3 studies)	OR 4.73	2.95, 7.58
				Premenstrual syndrome (6 studies)	OR 2.42	1.84, 3.18
				Sterilisation (5 studies)	OR 1.35	1.04, 1.75
				Oral contraceptive use (10 studies)	OR 0.65	0.60, 0.71
				Pelvic inflammatory disease (2 studies)	OR 1.58	1.09, 2.30
				Circumcision (1 study)	OR 3.75	1.46, 9.67
				Sexual assault (4 studies)	OR 1.60	1.29, 2.00
				Emotional difficulties (1 study)	OR 2.18	1.45, 3.27
				Psychological symptoms (1 study)	OR 3.72	2.10, 6.60
				Suicidal tendency (1 study)	OR 2.45	1.48, 4.05
				No-sensuality (1 study)	OR 8.12	3.37, 19.54
				Somatisation (3 studies)	OR 3.04	1.42, 6.53

Abbreviations: NR,not reported; OR, odds ratio; RR, rate ratio; SES, socioeconomic status a. rates are prevalence rates unless otherwise specified

^b. confidence intervals are reported as 95% CI in all primary studies, except the systematic review by Latthe (2006) where 99% CIs were reported to account for possible multiple testing ^c. range 0-40, higher score indicates worse mental health

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