

Supplementary Table 1: Database search strategy

Summary

Databases	Jan 1 st 2000 to August 2 nd 2022	August 1 st 2022 to June 27 th 2023	Jan 1 st 2000 to June 27 th 2023
Wiley Cochrane Database of Systematic Reviews	268	11	279
EBSCOhost CINAHL Complete	121	9	130
Web of Science Core Collection	506	56	562
APA PsycInfo	3	1	4
Ovid EMBASE	763	194	957
Ovid MEDLINE(R) ALL	388	24	412
Total including duplicates	2049	295	2344

Wiley Cochrane Database of Systematic Reviews

ID	Search
#1	[mh "Surgical Procedures, Operative"]
#2	(surger* or surgical* or operation? or postsurg* or postoperati* or perioperati*):ti,ab,kw
#3	#1 OR #2
#4	((pain OR neuralgia*) NEAR (long term OR longterm OR recur* OR persist* OR followup OR follow up OR longitudinal OR chronic* or trajector*)):ti,ab,kw
#5	[mh "Chronic Pain"]
#6	[mh "Pain, Postoperative"]
#7	(post-surg* pain NEAR ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)):ti,ab,kw
#8	("post-operative pain" NEAR ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)):ti,ab,kw
#9	#4 OR #5 OR #6 OR #7 OR #8
#10	[mh "Risk Factors"]
#11	[mh "Risk Assessment"]
#12	[mh "Health Risk Behaviors"]
#13	(risk score* or risk factor* or risk assess* or relative risk* or risk analys* or protective factor* or predictor* or risk* behavio?r or risk* health behavio?r):ti,ab,kw
#14	#10 OR #11 OR #12 OR #13
#15	#3 AND #9 AND #14

Search Date August 2, 2022: 268 results were retrieved.

Search Date June 27, 2023: additional 11 results were retrieved using the same search strategy.

EBSCOhost CINAHL Complete

#	Query	Limiters/Expanders	Results
S1	(MH "Surgery, Operative+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	744,637
S2	TI (surger* or surgical* or operation? or postsurg* or postoperati* or perioperati*) OR AB (surger* or surgical* or operation? or postsurg* or postoperati* or perioperati*)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	525,745
S3	S1 OR S2	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	994,757
S4	TI ((pain or neuralgia*) N5 (long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)) OR AB ((pain or	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	52,869

	neuralgia*) N5 (long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*))		
S5	(MH "Chronic Pain")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	25,572
S6	(MH "Postoperative Pain")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	20,239
S7	TI ("post-surg* pain" N2 ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)) OR AB ("post-surg* pain" N2 ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	113
S8	TI ("post-surg* pain" N2 ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)) OR AB ("post-surg* pain" N2 ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	113
S9	S4 OR S5 OR S6 OR S7 OR S8	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	78,580
S10	(MH "Risk Factors+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	227,038
S11	(MH "Risk Assessment")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	0
S12	(MH "Risk Taking Behavior")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	21,974
S13	TI (risk score* or risk factor* or risk assess* or relative risk* or risk analys* or protective factor* or predictor* or risk* behavio?r or risk* health behavio?r) OR AB (risk score* or risk factor* or risk assess* or relative risk* or risk analys* or protective factor* or predictor* or risk* behavio?r or risk* health behavio?r)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	405,936
S14	S10 OR S11 OR S12 OR S13	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	631,678
S15	S3 AND S9 AND S14	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	2,736
S16	S15 NOT ((MH "Child+") or (MH "Adolescence")) NOT (MH "Adult+")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	905
S17	S15 NOT ((MH "Child+") or (MH "Adolescence")) NOT (MH "Adult+")	Limiters - Published Date: 20000101-20221231; English Language Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	857
S18	S15 NOT ((MH "Child+") or (MH "Adolescence")) NOT (MH "Adult+")	Limiters - Published Date: 20000101-20221231; English Language; Publication Type: Meta Analysis, Systematic Review Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	121

S19	scoping review*	Limiters - Published Date: 20000101-20221231; English Language; Publication Type: Meta Analysis, Systematic Review Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	5,158
S20	S17 AND S19	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	1
S21	S18 OR S20	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	121

Search Date August 2, 2022: 121 results were retrieved.

Search Date June 27, 2023: additional 9 results were retrieved using the same search strategy.

Web of Science Core Collection

surger* or surgical* or operation? or postsurg* or postoperati* or perioperati* (Topic) and pain or neuralgia* (Topic) and "long term" OR longterm OR recur* OR persist* OR followup OR "follow up" OR longitudinal OR chronic* or trajector* (Topic) and "risk score*" or "risk factor*" or "risk assess*" or "relative risk*" or "risk analys*" or "protective factor*" or predictor* or "risk* behavio?r" or "risk* health behavio?r" (Topic) and English (Language) and 2000-01-01/2022-08-02 (Publication Date) and "meta-analysis" "meta-analyses" or "meta analysis" or "meta analyses" or "systematic review*" or "scoping review*" (All Fields)

Search Date August 2, 2022: 506 results were retrieved.

Search Date June 27, 2023: additional 56 results were retrieved using the same search strategy.

APA PsycInfo 1806 to July Week 4 2022		Results
1	exp Surgery/	78365
2	(surger* or surgical* or operation? or postsurg* or postoperati* or perioperati*).mp.	104123
3	1 or 2	155934
4	((pain or neuralgia*) adj5 (long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)).mp.	29268
5	exp Chronic Pain/	15161
6	("post-surg* pain" adj2 ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)).mp.	47
7	("post-operative pain" adj2 ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)).mp.	19
8	4 or 5 or 6 or 7	29268
9	exp Risk Factors/	92877
10	exp Risk Assessment/	14977
11	exp Health Risk Behavior/	3299
12	(risk score* or risk factor* or risk assess* or relative risk* or risk analys* or protective factor* or predictor* or risk* behavio?r or risk* health behavio?r).mp.	373598
13	9 or 10 or 11 or 12	373598
14	3 and 8 and 13	324
15	(adult* or "middle aged" or elderly or senior* or aged).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word]	1326232
16	14 and 15	160
17	limit 16 to (english language and ("0830 systematic review" or 1200 meta analysis or 1300 metasyntesis) and yr="2000 -Current")	3
18	scoping review*.mp.	3486
19	16 and 18	0

Search Date August 5, 2022: 3 results retrieved.

Search Date June 27, 2023: one additional result was retrieved using the same search strategy.

Ovid Embase 1974 to 2022 August 04		Results
1	exp surgery/ or exp general surgery/	5426410
2	(surgical* or surger*).fs.	2247925
3	(surger* or surgical* or operation? or postsurg* or postoperati* or perioperati*).mp.	4975225
4	1 or 2 or 3	6715445
5	((pain or neuralgia*) adj5 (long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)).mp.	192659
6	exp chronic pain/	71180
7	exp postoperative pain/	80616
8	("post-surg* pain" adj2 ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)).mp.	482
9	("post-operative pain" adj2 ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)).mp.	226
10	5 or 6 or 7 or 8 or 9	263308
11	exp risk factor/	1237979
12	exp risk assessment/	678506
13	exp high risk behavior/	30780
14	(risk score* or risk factor* or risk assess* or relative risk* or risk analys* or protective factor* or predictor* or risk* behavio?r or risk* health behavio?r).mp.	2769310
15	11 or 13 or 12	1774099
16	4 and 10 and 15	8030
17	16 not (exp juvenile/ not exp adult/)	7693
18	limit 17 to (english language and yr="2000 -Current")	7171
19	limit 18 to (meta analysis or "systematic review")	760
20	"scoping review*".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	16064
21	18 and 20	7
22	19 or 21	763

Search Date August 5, 2022: 763 results retrieved.

Search Date June 27, 2023: additional 194 results were retrieved using the same search strategy.

Ovid MEDLINE(R) ALL 1946 to August 04, 2022		Results
1	exp Surgical Procedures, Operative/	3449099
2	(surgical* or surger*).fs.	2186299
3	(surger* or surgical* or operation? or postsurg* or postoperati* or perioperati*).mp.	3804800
4	1 or 2 or 3	5163254
5	((pain or neuralgia*) adj5 (long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)).mp.	118473
6	exp Chronic Pain/	20383
7	Pain, postoperative/	45827
8	("post-surg* pain" adj2 ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)).mp.	235
9	("post-operative pain" adj2 ("long-term" or chronic or long term or longterm or recur* or persist* or followup or follow up or longitudinal or chronic* or trajector*)).mp.	104
10	5 or 6 or 7 or 8 or 9	159580
11	exp Risk Factors/	932933
12	exp Risk Assessment/ or exp Health Risk Behaviors/	305854
13	(risk score* or risk factor* or risk assess* or relative risk* or risk analys* or protective factor* or predictor* or risk* behavio?r or risk* health behavio?r).mp.	1960842
14	11 or 12 or 13	1964376

15	4 and 10 and 14	6873
16	15 not ((exp infant/ or exp child/ or adolescent/) not exp adult/)	6459
17	limit 16 to (english language and yr="2000 -Current")	5719
18	limit 17 to (meta analysis or "systematic review")	384
19	scoping review*.mp.	15337
20	17 and 19	4
21	18 or 20	388

Search Date August 5, 2022: 388 results were retrieved.

Search Date June 27, 2023: additional 24

Supplementary table 2: List of extracted data from the 36 included reviews

2A: Study characteristics

Reference	Review type	Guideline used	Protocol registration	End date of search (start date limit)	N primary studies	Type of studies
Achttien 2021 ¹⁷	SyR	PRISMA	Yes, PROSPERO CRD42015023430	2020-Sep-20	16	Observational (31 prospective cohort)
Andreoletti 2022 ¹⁸	SyR and MA	PRISMA, MOOSE	Yes, PROSPERO 2020 CRD 42020173427	2021-Mar-16	71	Observational (prospective and retrospective, cohort and cross-sectional)
Ashooron 2023 ¹⁹	SyR and MA	MOOSE	Yes, PROSPERO CRD42018065943	2021-Apr-30	30	Observational (cohort and case-control studies)
Burns 2015 ²⁰	SyR		No	2014-Aug-25	6	Observational (2 prospective cohort and 4 case-control studies)
Celestin 2009 ²¹	SyR		No	2008-Aug-01	25	Observational (prospective studies)
Chidambaran 2020 ²²	SyR and MA	STREGA PRISMA	No	2017-Dec (2001-Jan)	21 (9 MA)	Observational (14 prospective, 6 retrospective cohort studies, 1 case control study)
Clephas 2023 ²³	SyR and MA	PRISMA	Yes, PROSPERO CRD42021227888	2022-Jun-27	56	Interventional (28 RCT) and observational (12 retrospective and 16 prospective studies)
Compagnoni 2019 ²⁴	SyR	PRISMA	Yes, PROSPERO 2019, CRD42019121180.	2019-Feb	4	Observational (1 prospective and 3 retrospective studies)
Denboer 2006 ²⁵	SyR	not specified	No	Not recorded	11	Observational (prospective cohort)
D'Onghia 2021 ²⁶	SyR and MA	PRISMA	No	2020-Nov-20	27 (19 MA)	Interventional (RCT, quasi-RCTm) and observational (prospective or retrospective cohort)
Dorow 2017 ²⁷	SyR	PRISMA	Not specified	2015-Apr	21	Observational (longitudinal, prospective cohort studies)
Ghoshal 2023 ²⁸	SyR and MA	not specified	Yes, PROSPERO CRD42020152146	2022-Feb-06	81	Interventional and observational (prospective (69) and retrospective (12) studies)
Giusti 2021 ²⁹	SyR and MA	PRISMA	No	2020-Feb-21	83 (73 studies) (41 MA)	Observational (prospective (56 studies) or retrospective (17 studies), longitudinal)
Goplen 2019 ³⁰	SyR and MA	PRISMA	No	2018-Feb-15 (data from 2010 to 2017)	6	Observational (retrospective cohort studies)
Halicka 2022 ³¹	SyR	PRISMA plus CRD	Yes, PROSPERO CRD42020180845	2021-Mar 29	21 (18 studies)	Interventional and observational (retrospective (8), preprospective (10) studies)
Hernandez 2015 ³²	SyR	Cochrane collaboration	No	2013-May	37	Interventional (1 RCT) and observational (prospective (30) and retrospective (2)) and systematic reviews (4)
Hinrichs-Rocker 2009 ³³	SyR	Cochrane collaboration	No	2006-Jul-19 (1996-Jan)	50	Interventional (7 RCT) and observational (21 prospective and 21 retrospective cohortstudies, one case control study)
Innocenti 2021 ³⁴	SyR	PRISMA	Yes, PROSPERO CRD42019122303	2020-Nov-15	11	Observational (prospective cohort studies)
Lewis 2015 ³⁵	SyR and MA		No	2012-Dec (1080)	32 (28 MA)	Observational (23 prospective, 5 retrospective and 4 cross-sectional studies)
Lim 2022 ³⁶	SyR and MA	PRISMA	No	2019-Nov-11	317 (breast surgery: 100 MA; thoracic surgery: 101 MA)	Interventional (breast 26 RCT, thoracic 63 RCT) and observational (breast 48 prospective, 68 retrospective, 5 cross-sectional; thoracic 53 prospective, 53 retrospective, 2 cross-sectional studies)
Lungu 2016 ³⁷	SyR		No	2015-Apr	22	Observational (not specified)

McCowat 2019 ³⁸	SyR	PRISMA	Yes, PROSPERO CRD42017065098	2017-May-01 (1997)	12	Observational (prospective cohort)
McKillop 2014 ³⁹	SyR	not specified	No	2012-May (1980)	13	Observational (longitudinal studies)
Meert 2023 ⁴⁰	SyR	PRISMA	Yes, PROSPERO CRD42022350609	2022-Aug-01	49	Interventional (2 RCTs) and observational (2 case-control, 45 prospective studies)
Moloney 2021 ⁴¹	SyR and MA	PRISMA	Yes, PROSPERO CRD42016029834	2019-Jan (1990)	47 (26 MA)	Observational (20 cross-sectional, 28 longitudinal studies)
Ng 2021 ⁴²	SyR and MA	PRISMA, Cochrane	No	2020-Jul	12	Observational (4 prospective and 8 retrospective cohort)
Nunez Cortes 2022 ⁴³	SyR and MA	PRISMA	Yes, PROSPERO CRD42020181709	2021-Aug-14	15 (7 MA)	Interventional (1 RCT) and observational (13 prospective, 1 retrospective study)
O'Connor 2022 ⁴⁴	SyR	PRISMA	Not specified	2021-Nov-12	21	Interventional (nonrandomized cohort trials; prospective (15); retrospective (6))
Olsen 2023 ⁴⁵	SyR and MA	PRISMA	Yes, PROSPERO CRD42018079069	2023-Feb-06 (2000-Jan-01)	29 (25 MA)	Observational (Prospective longitudinal studies)
Rogowsky 2022 ⁴⁶	SR	Arksey and O'Malley framework	Yes, Open Science Framework, DOI 10.17605/OSF.IO/KTY6Q	2020-Dec-10	17	Interventional (3 RCT) and observational (8 prospective and 2 retrospective cohort, 4 cross-sectional)
Terradas 2021 ⁴⁷	SyR	PRISMA	Not specified	2020-Oct-31	22	Observational (prospective cohort studies)
Theunissen 2012 ⁴⁸	SyR and MA	not specified	Not specified	2010-Oct (1958)	29 (15 MA)	Observational (prospective cohort studies)
Van Bougaert 2022 ⁴⁹	SyR	PRISMA	Yes, PROSPERO CRD42020130626	2021-Oct	24	Observational (4 retrospective and 19 prospective cohort studies)
Varallo 2022 ⁵⁰	SyR and MA	PRISMA	Yes, PROSPERO 2021 CRD42021272654	2021-Aug-01	21 (18 studies) (12 MA)	Observational (16 prospective and 2 retrospective cohort, 4 abstracts)
Wluka 2020 ⁵¹	SyR and MA	PRISMA	Yes, PROSPERO 2019, 2020 CRD42020152421	2020-Mar	5	Observational (6 prospective cohort studies)
Zhao 2023 ⁵²	MA	PRISMA, MOOSE	Yes, PROSPERO CRD42022357137	2022-Apr	6	Interventional (2 RCT) and observational (4 prospective cohort studies)

Abbreviations: CRD: Centre for Reviews and Dissemination; MA: meta-analysis; SR: scoping review; SyR: systematic review

2B: Participant numbers and characteristics, surgery type and time

Reference	Collective number of participants in primary papers	Participant age	Participant sex/gender	Type of surgery (N)	time post-surgery
Achttien 2021 ¹⁷	8,388	≥18; 18-86 age range	Both gender	lumbar spine fusion surgery	1 to 2 years, 2 to 3 years
Andreoletti 2022 ¹⁸	48,974	>18	Both gender	Various types (elective non-obstetric surgery) (orthopedic (11), breast surgery (14), abdominal surgery (11), hernia (13), cardia-thoracic (15), other type/mixed surgery (7))	>3 months
Ashooron 2023 ¹⁹	26,517	≥18	Both male and female	TKA	>3 months
Burns 2015 ²⁰	662 (calculated)	49-85 age range (no inclusion criteria specified for age)	Both gender	TKA	>3 months
Celestin 2009 ²¹	3,228 (calculated)	age not specified	not specified	Lumbar spine surgery (discectomy, laminectomy, and	follow-up 3 months to 3 years

				fusion (21)) or implantation of a spinal cord stimulator (4)	
	11,192			Various types: breast surgery (5), hernia (4), lumbar discectomy (3), spine surgery (1), TKA (1), TSA (1), TKA+THA (1), abdominal surgery (1), caesarean (1), amputation (1), other type/mixed surgeries (2)	>3 months
Chidambaran 2020 ²²		≥18	Both genders (8 study cohorts included only female and 3 included only male participants)		
Clephas 2023 ²³	10,038	≥18	Both male and female (proportion of women: 44%)	thoracic surgery (lung and pleural surgery)	>3 months
Compagnoni 2019 ²⁴	12,266 (calculated)	adult	not specified	Shoulder surgery	> one year (one paper assessed only acute pain and is excluded from our analysis)
Denboer 2006 ²⁵	1,385 (calculated)	15-70	Both gender	Lumbar disc surgery (discectomy)	>6 months (one paper with 6 weeks follow-up is excluded from our analysis)
D'Onghia 2021 ²⁶	1,071,015 (calculate in quantitative, qualitative not stated)	age not specified	Both gender	Orthopedic surgery (TKA (13), THA (6), shoulder (4), spine (4), knee (1), elbow (1), Carpal tunnel (2)	12 weeks to 7 years (2 papers with assessment during the first months are excluded from our analysis)
Dorow 2017 ²⁷	2,581	15-82 years old (identified from table of primary studies)	Both gender	Lumbar disc surgery (discectomy)	short-term (< 3 months), medium-term (> 3 months and < 12 months) and long-term (> 12 months) (data for this review are taken from medium- and long-term)
Ghoshal 2023 ²⁸	171,354	≥18	female	TKR (54), THR (16), TKR+THR (11)	>3 months
Giusti 2021 ²⁹	40,784 (narrative synthesis); 38,894 (quantitative synthesis)	middle-aged (60.2+/-10.2 [mean+/-SD]).	Both (mean female percentage: 59.5%)	Various types (TKA (37), lumbar surgery (13), THR (5), hysterectomy/Gynecological surgery (4), ACD (4), Hernia repair (4), CABG (3), total shoulder arthroplasty (2), ankle and foot reconstruction (1), liver surgery (1), pelvic laparoscopy (1), meniscectomy (1), arthroscopic rotor cuff repair (1), trauma surgery (1), mixed surgeries (2)	>3 months
Goplen 2019 ³⁰	7,356	>20	Both male and female	TJA (TKA (3), THA (1), both (2))	>6 months
Halicka 2022 ³¹	5,780	≥18	Both gender	Spinal surgery	>3 months
Hernandez 2015 ³²	43,319 (calculated)	>60	Both male and female, but more females have association	TKA and THA	>4 months (3 of the systematic reviews included papers with <3 months follow-up and were excluded when possible)
Hinrichs-Rocker 2009 ³³	25,288 (calculated from 48/50 studies)	adult	Both gender	Various types: hernia (11), thoracotomy (8), cholecystectomy (5), breast surgery (8), spine surgery (8), knee surgery (3), other surgeries (5)	>3 months
Innocenti 2021 ³⁴	952 (calculated)	≥18	not specified	Shoulder surgery	>3 months
Lewis 2015 ³⁵	29,993	56-77 age range (no inclusion criteria)	Both gender	TKA	>3 months

		specified for age)			
Lim 2022 ³⁶	17,524 (10,980 for breast surgery; 6,544 for thoracic surgery)	≥18	Both gender	Breast surgery (147) and thoracic surgery (170)	>3 months
Lungu 2016 ³⁷	12,660 (calculated)	older age	Both gender	THA	>3 months
McCowat 2019 ³⁸	3,452 (calculated)	>18	women	Breast cancer surgery	>3 months for chronic pain (data on acute pain excluded from our analysis)
McKillop 2014 ³⁹	unclear - overlap of cohorts in individual studies	adults	not specified	Lumbar spinal stenosis	3, 6, 12 months
Meert 2023 ⁴⁰	47,255 (Calculated)	≥18	Both gender	TKA	>6 months
Moloney 2021 ⁴¹	15,987	≥18	females	Breast Cancer surgery	0–7 days (acute pain), 7 days to 3 months (subacute pain), >3 months to 12 months (early chronic), >12 months (late chronic) (we only used data for early and late chronic pain for our analysis)
Ng 2021 ⁴²	29,484	≥18	Both gender	UKA	>1 year (one study reported an early 30-day complication, data from this study were excluded)
Nunez Cortes 2022 ⁴³	2,599 (calculated)	46+/-9 and 62+/-12 [mean+/-SD] (no inclusion criteria specific for age)	Both gender	Carpal tunnel release (CTR)	>3 months
O'Connor 2022 ⁴⁴	12,925	≥18	Both (proportion of females: 55%)	THA	>3 months (studies on acute pain were excluded from our analysis)
Olsen 2023 ⁴⁵	10,360	adults; range of mean age: 63-73	Both (proportion of female: 49-95%)	TKA	3, 6, 12 months
Rogowsky 2022 ⁴⁶	4,640 (calculated), (11 to 1,398 range)	adult	women	Breast cancer mastectomy with alloplastic implant-based reconstruction (IBR)	>3 months
Terradas 2021 ⁴⁷	7,156	46 to 91 age range, 67.92 [mean]	Both males and females (proportion of females: 75%)	TKA, UKA	6, 12 months
Theunissen 2012 ⁴⁸	6,628	adult	Both gender	Various types: breast surgery (1), lumbar disc (8), inguinal hernia (1), hysterectomy (1), mastectomy (1), prostatectomy (2), nephrectomy (1), lower limb amputation (1), thoracotomy (1), knee replacement (7), hip replacement (1), Knee and hip arthroplasty (1), shoulder surgery (1), and various types (2)	>3 months

Van Bougaert 2022 ⁴⁹	17,881	≥18; range of mean age range: 40-75	Both men and women (proportion of women: 50.98%)	lumbar spine surgery	>3 months
Varallo 2022 ⁵⁰	8,408	≥18	Both (mean percentage of female: 68%)	Various types: TKA (7), breast surgery (3), thoracotomy (2), THA (2), rotator cuff repair (1), THA and TKA (1), Hip surgery (1) and any type (1)	>3 months
Wluka 2020 ⁵¹	863 (calculated)	adults; 65.1 to 72 range of mean age	Both (proportion of women: 60% (varied from 51 to 100% in individual studies))	TKA	>3 months
Zhao 2023 ⁵²	829	17-80 age range	females	spine surgery for lumbar degenerative disease	>6 months (data from studies <3 months were excluded)

Abbreviations: ACDF: Anterior cervical discectomy and fusion; CABG: coronary artery bypass graft; IBR: implant-based breast reconstruction; LD: Latissimus Dorsi; THA: Total hip arthroplasty; TJA: Total Joint Arthroplasty; TKA: Total knee arthroplasty; TMJ: Temporomandibular joint disorder

2C: Study objective, risk factor (RF) number (N), assessment, and identification

Reference	Study objective	RF variables assessed in primary studies (N)	List of RFs assessed in primary studies	Outcome measures	Identified RFs with association to CPSP: (N) with association/(N) assessed
Achtstien 2021 ¹⁷	To identify and evaluate the value of prognostic factors related to disability, pain and quality of life (QOL) for adult patients undergoing lumbar spine fusion surgery (LSFS)	39 (include peri-surgical factors)	work status, sick benefits, QOL, mental health, physical health, kinesiophobia, pain belief, efficacy, pre-operative back and leg pain, straight leg raise, disability, duration of pain, opioid use, height, weight, Marriage status, type of household, parenthood, Immigrant status, dementia, age, gender, BMI, education level, smoking status, self-rated health, walking capacity, distress, alcohol consumption, exercise habits, sciatica, and various peri-operative factors	pain. disability	pre-operative sick leave or no work 2/6, (pre-operative leg pain has reverse effect, eg more pre-surgical leg pain - less CPSP, 5/7), catastrophizing 1/1, female gender 3/7, lower educational level 1/1, smoking 1/5
Andreoletti 2022 ¹⁸	To assess the risk of CPSP related to three known perioperative risk factors, age, sex, pre-operative pain in the adult population of any non-obstetric elective surgery	3 (specifically included in search keywords)	age, sex, pre-operative pain		significant effect pre-operative pain (pain at surgical site 21/23, pain elsewhere 5/9, pain at unspecified location 9/9), younger age 12/15, female sex 11/45
Ashooron 2023 ¹⁹	To identify predictors of persistent pain following TKA	151 stated in text (including peri- and post-operative factors)	age, sex, BMI, pre-operative pain, pre-op range of motion (ROM), pain catastrophizing, comorbid diabetes, race, marriage status, income, occupation, education, physical activity, pre-operative physical functioning, pre-operative mental health, anxiety (state and trait), depression, mood disorders, Comorbidities (cancer, ischemic heart disease, pulmonary and kidney disease), fibromyalgia, pain in other areas of the body, pre-operative fatigue, sleep, central sensitization, pre-operative pain	pain	pain catastrophizing 3/3, younger age 6/15, female sex 10/16, moderate to severe pre-operative pain 5/13, non-white race 2/2, comorbid diabetes 2/3, pre-operative ROM 2/2, BMI 3/8

			threshold, duration of pre-surgical pain, Self-efficacy, Kinesiophobia, radiographic pattern [bilateral versus unilateral TKA, patella surface, type of implant, acute post-operative pain]		
Burns 2015 ²⁰	To systematically review the literature that reported the prospective impact of pain catastrophizing on pain that persists ≥ 3 months after TKA	1 (specifically included in search keywords)	pain catastrophizing	pain	pain catastrophizing 5/6
Celestin 2009 ²¹	To assess the strength of the evidence for the assumption that psychological variables are important predictors of pain-related and functional outcomes from lumbar surgery or spinal cord stimulator (SCS), and to identify which psychological factors are most likely to be predictive of outcomes	24 (grouped in 4 units: pain, psych, function, others)	PAIN predictors (pain intensity, pain descriptors, and pain location); PSYCH predictors (fear of pain, pain coping, depression, anxiety, hypochondriasis, and somatization); FUNCTION predictor (activity interference, level of activity, strength measures, disability, and exercise level); OTHER predictors (demographic information (e.g., age, gender), physical examination findings, pain duration, worker's compensation status, previous surgery, cigarette smoking, job satisfaction, litigation, and abuse history)	pain, function	pain predictors include high pain levels and multiple pain locations: 4/12 positive evidence ; psych predictors include poor coping, somatization, hypochondriasis, depression, anxiety: 14/18 positive evidence and 3/18 mixed evidence; Function predictors include activity interference, disability: 4/10 positive evidence; other predictors include lower education 1/2 and pain duration 1/5 both positive evidence; other predictors include age 4/5, gender 1/2, work status 5/5, abuse history 1/1, BMI 1/1, lower education 1/2, gender 1/2, all mixed evidence
Chidambaran 2020 ²²	To systematically review, assess quality, and summarize the studies in humans that have investigated genetic factors associated with CPSP	69 unique genes	genetic variations	pain	genetic factors (variation in the potassium voltage-gated channel gene (KCNS1); immune responses 2/2 studies
Clephas 2023 ²³	To identify and summarize the evidence of all prognostic factors for chronic post-surgical pain after lung and pleural surgery	45 (include peri- and post-operative factors)	ASA score; pre-operative pain; pain catastrophizing score; age; sex; BMI; diabetes mellitus; exercise tolerance; [postoperative pain; malignant disease; chemotherapy; radiation therapy; surgery duration; anesthesia technique and surgical technique]	pain	pre-operative pain 2/8 high effect, female sex 18/18 moderate effect, depression 3/3 high risk, anxiety 3/3 high risk, pain catastrophizing 3/3 high risk, diabetes 2/4 mixed; no significant effect or

					no risk for: age (n=20), BMI, (7), malignant disease (6), smoking (6), pre-operative opioid (2)
Compagnoni 2019 ²⁴	To search the currently available literature regarding the influence of fibromyalgia on clinical outcomes of patients undergoing surgery for shoulder pain	1 (specifically included in search keywords)	fibromyalgia	pain, NSAID consumption	fibromyalgia 3/3
Denboer 2006 ²⁵	To summarize scientific evidence concerning the predictive value of bio-psychosocial risk factors with regard to the outcome after lumbar disc surgery - To provide an insight into the most relevant prognostic factors that could contribute to the identification and selection of patients at risk, as well as the development of tailored post-operative treatment methods based on the predictive variables	23 (grouped into socio-demographic, clinical, work-related, psychological)	sociodemographic: gender, age, body weight, body length, education level and marital status; clinical: pre-operative status (including pre-operative pain and disability, other complaints and duration of complaints) and clinical signs (including segmental sensory loss, straight leg raising test, radiological findings and operative findings); work-related: a patient's physical work conditions, work satisfaction and duration of sick leave; psychological: depression, anxiety, somatization, coping strategies, life events and social support	pain (investigated in 5 studies), disability, work capacity	mostly positive evidence: pre-operative pain 2/3 and duration of pain 1/3; work satisfaction 1/2, duration of sick leave 1/2, anxiety 1/3, somatization, 1/2 coping 1/1; conflicting evidence: gender 1/3, depression 1/3; mostly negative evidence or no significant findings: age 1/3, marital status 1/2, pre-operative disability 0/2
D'Onghia 2021 ²⁶	To comprehensively characterize the available evidence on the consequences of pre-existent FM on the outcomes of orthopedic surgery	1 (specifically included in search keywords)	fibromyalgia	pain, functional status, patient satisfaction, opioid consumption, post-operative complications	fibromyalgia 25/25
Dorow 2017 ²⁷	To answer the following questions: 1. How does pain intensity in patients undergoing surgery for a lumbar herniated disc change over time? 2. Which socio-demographic, medical, occupational and psychological variables are associated with pain intensity in lumbar disc surgery patients?	24 (grouped into socio-demographic, medical, work-related, psychological)	sociodemographic: gender, age, education level; medical: pre-operative pain intensity, pre-operative intake of analgesics, pre-operative impaired fibrinolytic activity, pre-operative duration of complaints, neurological deficits complaints, disability, straight leg raising test, operative findings, radiological findings, smoking, weight; work-related: pre-operative working ability, duration of sick leave, physical work conditions, assessed chance to return to work within 3 months, workers' compensation; psychological: depression, anxiety, somatization, mental wellbeing, coping	pain	mostly positive evidence: female gender 3/9, pre-operative pain duration 3/8; conflicting evidence: higher age 5/9, lower educational level 1/1, smoking 1/3, weight 0/1, working ability 1/1, duration of sick leave 2/2, physical work condition 0/2, worker's compensation 1/1; mostly weak evidence: pre-operative pain intensity 5/6, neurological deficit 2/2, disability 3/4,

					depression 7/8, anxiety 2/2, somatization 2/2, poor mental health 2/2, poor coping 3/3
Ghoshal 2023 ²⁸	To perform a systematic review and meta-analysis on the reported factors associated with PPSP after total hip joint and knee joint replacement	8 (including additional factors as confounding factors)	age, gender, BMI, anxiety (state and trait), depression, pain catastrophizing, knee or hip joint pain or pain elsewhere in the body, comorbidities such as hypertension, diabetes, ischemic heart disease, chronic obstructive pulmonary disease, asthma, and neurological illnesses, [peri- and post-operative factors such as regional anesthesia, duration of surgery, acute post-operative pain]	pain	younger age 4/35, female sex 4/29, BMI 5/12, anxiety 8/20, depression 8/21, pre-op pain (knee, hip, or elsewhere in the body) 20/33, comorbidities 7/7 (hypertension, diabetes, ischemic heart disease, chronic obstructive pulmonary disease, asthma, and neurological illnesses), pain catastrophizing 2/11
Giusti 2021 ²⁹	To clarify the role of psychological predictors of postsurgical pain to help clinicians to identify patients at risk for poor outcomes	32 psychological and psychosocial predictors	depression, anxiety (state, trait, pain-related), catastrophizing, mental health, kinesiophobia, self-efficacy, coping, mental flexibility, mental cognition, stress, psychological distress, physical health, comorbidities, pain disability, social support, outcome expectancy, self-esteem, surgical fear, locus of control, illness perception, optimism, pessimism, psychological robustness, mood disorder, borderline personality, psychiatric diagnosis, somatization, expected pain control, activity expectation, expected pain	pain	depression 18/38, anxiety (include trait and state) 21/37, catastrophizing 16/28, mental health 7/11, kinesiophobia 2/12, self-efficacy 2/7, coping 3/10, psychological distress/stress 6/10, social support 3/7, surgical fear 1/5, somatization 1/3, optimism 3/5
Goplen 2019 ³⁰	To investigate the impact of preoperative opioid use on patient reported outcomes after total joint arthroplasty	1 (specifically included in search keywords)	pre-operative opioid use	pain	pre-operative opioids 6/6
Halicka 2022 ³¹	To identify and evaluate preoperative predictors of pain and disability outcomes after spinal surgery for the treatment of chronic low back pain and/or radicular pain	30 listed in table	demographic factors (age, sex, and ethnicity), socioeconomic characteristics (education, work status, and workers' compensation), diagnosis (spinal pathology and sciatica), symptom duration, pain (intensity, quality, night-time pain, bothersomeness, and neuropathic component of pain), QST (sensory and pain thresholds, conditioned pain modulation), disability, comorbidities (comorbid conditions, body mass index, and smoking), pain-related psychological factors (pain catastrophizing, pain sensitivity, pain drawing, and kinesiophobia), affective-motivational (mental	pain (investigated in 13 studies), disability	sociodemographic: older age 1/3, education level 1/1, no association for: sex 0/4, ethnicity 0/1, work status 0/3, worker compensation 0/1; pre-operative pain and duration: type of spinal pathology 2/4, symptom duration 0/4, pain intensity 1/2; number of comorbidities 1/1, diabetes 1/1, better physical status 1/1, BMI 1/1, no effect

			functioning, anxiety, depression, vitality, and job-related resignation), and personality factors (neuroticism)		for disability 0/2, smoking; psychological factors: catastrophizing 1/2, anxiety 1/1 depression 1/2, no effect for pain severity 0/1, mental functioning 0/1
Hernandez 2015 ³²	To perform a systematic and critical review of the available literature to identify possible preoperative factors that impact postoperative pain in patients in whom THA and TKA are indicated	> 22 listed in table	age, sex, level of education, socioeconomic status, race, profession, underlying diseases (type, duration, etc), comorbidities, BMI, level of self-care ability, quality of life, pre-operative pain level (intensity, duration, etc), surgeon-related factors (age, sex, experience), waiting list, type of hospital, expectations, depression, anxiety, etc.	pain	younger age 6/18, older age 2/18 female 16/18, BMI (>35) 7/11, low socioeconomic status 1/1, low level of education 5/10, lack of social support 2/4, living alone 1/4, pre-surgery pain 12/13, comorbidities 4/11, low back pain 1/1, poor functional status 3/5, psychological factors (depression 3/3, anxiety 1/1, pain catastrophizing 2/2), poor pre-operative mental health 2/3, race 2/3
Hinrichs-Rocker 2009 ³³	To develop an instrument for identifying patients at high risk for CPSP, to optimize clinical pain management and to identify and make a preliminary analysis of the relationship between psychosocial elements (predictors and correlates) and CPSP.	34 listed in table	depression, psychological vulnerability, stress, psychological distress, late return to work, anxiety, health status and wellbeing, self-control, vitality, self-perception of recovery, higher pain relief expectation, sense of control over health, patient's decision making, psychological aspect of work, social support, marital status, household size, return to work/social activity, income, litigation/compensation, low mental health care, hospital where surgery performed, younger age, pre-operative state of neuroticism, female gender, employment, low education, race, surgeon performing surgery (experience)	pain	depression 4/8, psychological vulnerability 3/4, psychological distress/stress 2/3, late return to work 3/3
Innocenti 2021 ³⁴	To systematically review whether the altered central pain modulation has a significant influence on post-surgical outcomes in patients undergoing shoulder surgery due to musculoskeletal disorders	9 listed	Psychological Characteristics: depressive symptoms (included psychological distress), anxiety, pain catastrophizing, fear avoidance beliefs, self-efficacy; clinical manifestations of altered central pain modulation: presence of referred pain; quantitative sensory testing: hyperalgesia (punctate stimuli), temporal summation of suprathreshold heat pain response	pain, function, QOL	fear avoidance belief 2/2, psychological distress 1/2, depression 1/6, anxiety 1/5, somatization 1/1, pre-operative pain 1/1; no association for pain catastrophizing 0/1, self-efficacy 0/1,
Lewis 2015 ³⁵	To provide a systematic review and meta-analysis of	43 (including peri-operative predictors)	patient characteristic (Age, Gender, Education, Ethnicity, Work status, Income, Compensation); clinical	pain	high strength of evidence: catastrophizing 3/3,

	predictor variables associated with persistent pain after total knee arthroplasty		(Preoperative pain, Weight, Comorbidities, Function, Other pain sites, Pain duration, Pain and function, Diagnosis, Previous contralateral TKA, Disease severity, Quantitative sensory testing), psychosocial (Depression, Social support, Mental health, Anxiety, Catastrophizing, Fear of movement, Self-efficacy, Expectations, Pessimism/optimism, Quality of life, Beliefs, Coping skills, Stress); perioperative (Patella resurfacing, Type of surgery, Implant type, Operative difficulty, Perioperative pain, Surgery duration) and biomechanical predictors (Chondromalacia, Varus/valgus angle, Fixed flexion, Gait parameters)		mental health 3/4, pre-operative pain 8/21, pain at other sites 1/2, comorbidities 4/11, and depression 4/6. Predictors with lower frequencies: age 7/19, gender 6/31, education 2/7, pain duration 1/3, social support 1/5, fear of movement 1/2, self-efficacy 1/2, coping skills 1/1
Lim 2022 ³⁶	To systematically review and meta-analyze the literature on risk factors of PPSP after breast and thoracic surgeries	34 for breast and 29 for thoracic (including per-and operative predictors)	breast surgery: age, BMI, diabetes, education; anxiety, depression, pain catastrophizing, smoking; pre-operative pain (plus cancer-, procedure- and treatment-related); thoracic surgery: age, BMI, comorbidities, sex, anxiety, depression, smoking, pre-operative pain (plus procedure- and treatment-related)	pain (analgesic consumption was considered a surrogate outcome for pain)	breast surgery: younger age 15/25, higher BMI 2/3, anxiety 3/5, depression 4/4, smoking 1/2, pre-operative pain 7/10, education 1/1; thoracic surgery: younger age 7/14, female sex 4/10, comorbidities 1/3, pre-operative pain 1/3, higher BMI 2/3, anxiety 1/2, depression 1/2, smoking 1/1
Lungu 2016 ³⁷	To answer which preoperative factors are most consistently associated with postoperative patient-reported pain and function up to 2 years following primary unilateral THA for hip osteoarthritis	15 listed	Age, gender, living alone, educational level, socioeconomic deprivation, surgery expectations, pre-operative pain, bodily pain, comorbidity, BMI, mental health, general physical health, lower radiographic OA severity, contralateral hip OA, greater widespread pain sensitivity	pain, function	lower educational status 3/3, pre-operative levels of pain 9/12, higher BMI index (>30) 6/10, more comorbidity 7/8, lower radiographical osteoarthritis severity, worse physical health 4/4, older age 4/11, living alone 1/1,
McCowat 2019 ³⁸	To identify a broader range of psychological predictors of acute and chronic pain following breast cancer surgery through a systematic review of relevant prospective studies	10 for chronic pain	Anxiety, depression, Catastrophizing, distress, alexythemia, affect, dispositional optimism, psychological robustness, disease-specific emotional functioning, pain response expectancies	pain (8 studies investigated pain >3 months after surgery)	depression 3/6, anxiety 3/6, pain catastrophizing 0/1, alexithymia 1/1, psychological vulnerability 1/1, distress 1/1
McKillop 2014 ³⁹	To examine the literature on depression as a prognostic factor of outcomes in patients	1 (specifically included in search keywords)	Depression	pain (investigated in 6 studies), disability,	depression 4/6

	with lumbar spinal stenosis			symptom severity	
Meert 2023 ⁴⁰	To identify metabolic factors and inflammatory markers that are predictive of postoperative total TKA outcome	8 independent predictors listed in table	Inflammatory markers and metabolic factors such as obesity, diabetes, hypertension, hypercholesterolemia, metabolic syndrome, Dyslipidemia, Synovitis, cytokine levels (various)	pain (investigated in 35 studies), functional disability, QOL	BMI 10/27, diabetes 2/9, cytokine levels 3/3, Synovitis 1/1 with reverse effect (more severe pre-operative synovitis = less CPSP)
Moloney 2021 ⁴¹	To (1) assess associations between psychological factors and pain after breast cancer (BC) treatment and (2) determine which preoperative psychological factors predicted pain in the acute, subacute, and chronic time frames after BC surgery	13 assessed for pain >3 months	Depression, anxiety, pain catastrophizing, Alexithymia, psychological robustness, distress, locus of pain, coping, emotional functioning, mental health, emotional stability, somatization, pain vigilance and awareness	pain (34 studies assessed pain >3 months after surgery)	depression 17/24, anxiety 13/19, pain catastrophizing 4/7, distress 4/6, mental health 3/3, psychological robustness 1/2, emotional functioning 1/2, alexithymia 1/1, somatization 1/1
Ng 2021 ⁴²	To compare clinical and functional outcomes of UKA in obese to non-obese patients	1 (specifically included in search keywords)	obesity (BMI>30kg/m2)	pain (investigated in 6 studies), function	obesity 4/6
Nunez Cortes 2022 ⁴³	To determine the effects of the cognitive and mental health factors on the outcomes after carpal tunnel release	7 listed	Depression, anxiety, pain catastrophizing, self-efficacy, kinesiophobia, fear avoidance, mental health	pain (investigated in 8 studies), function, patient satisfaction	depression 5/6, anxiety 2/4, catastrophizing 1/1, mental health 1/1
O'Connor 2022 ⁴⁴	To determine the relationship between patient preoperative psychological factors and postoperative THA outcomes, specifically pain and function	6 listed	psychological variables (depression, anxiety, pain catastrophizing, self-efficacy, somatization, optimism/pessimism)	pain (9 studies investigated pain >3 months after surgery), function	depression 5/5, anxiety 4/4, mental health 2/2, self-efficacy 1/1, pessimism 0/1
Olsen 2023 ⁴⁵	To systematically review and synthesize preoperative and intraoperative factors associated with pain after total knee arthroplasty (TKA) in patients with osteoarthritis	61 (including peri-operative factors)	patient characteristic (age, sex, education, ethnicity); clinical (preoperative pain, BMI, sleep, comorbidities, disability, physical functioning, pain at other sites, osteoarthritis severity); psychosocial (depression, anxiety, catastrophizing, kinesiophobia, self-efficacy, outcome expectations, coping, psychological distress, social support, mental health, opioid use); various perioperative	pain	mental health (including anxiety, depression, psychological distress) 5/6, pain catastrophizing 3/4, self-efficacy 2/2, higher pre-op pain 4/4, other chronic pain 2/2, BMI 1/3, kinesiophobia 0/1,
Rogowsky 2022 ⁴⁶	To address the question: what is the prevalence and severity of chronic pain in breast cancer patients who have undergone mastectomy with alloplastic IBR?	9 listed (including peri-operative predictors)	age, ethnicity, (peri/post-operative: axillary dissection, lack of perioperative local anaesthetic, nurse-controlled analgesia as opposed to patient-controlled, acute postoperative pain, bilateral reconstruction, the use of a tissue expander and limited post-operative physiotherapy)	pain	younger age (<65) 2/2
Terradas 2021 ⁴⁷	To investigate the influence of psychosocial factors	9 listed	anxiety, depression, pain catastrophizing, self-efficacy, psychological distress, fear of	pain, function	catastrophizing 10/14, kinesiophobia 2/3, anxiety 12/13,

	on pain and functional outcomes after KA at 6 and 12 months after surgery		movement, expectancies, mental health, social support		depression 7/13, self-efficacy 1/5, mental health1/1, psychological distress 1/3, pain expectancies 2/2, social support 0/1
Theunissen 2012 ⁴⁸	To investigate whether high levels of preoperative anxiety or pain catastrophizing are associated with an increased risk of CPSP	2 (specifically included in search keywords)	anxiety, pain catastrophizing (measured with 14 different instruments)	pain	anxiety 16/29, pain catastrophizing 16/29 (mainly musculoskeletal surgeries)
Van Bougaert 2022 ⁴⁹	To provide an updated overview of the predictive value of fear avoidance beliefs for outcomes following surgery for lumbar degenerative disease	1 (specifically but measured with various tools)	fear avoidance belief including pain-related fear (kinesiophobia, fear of work-related activities, fear of physical activities), pain catastrophizing, pain anxiety	pain, function, QOL	fear avoidance beliefs: pain catastrophizing 1/2, pain-anxiety 1/2, pain-related fear (kinesiophobia, fear of work-related activities, fear of physical activity) 0/3
Varallo 2022 ⁵⁰	To evaluate if preoperative and perioperative sleep disturbances and disorders are risk factors for CPSP	1 (included a variety of confounders: age, sex, depression, anxiety, catastrophizing, PTSD, BMI, somatization, smoking, pre-operative pain, socioeconomic status, pre-operative opioid use)	pre-operative (and peri-operative) sleep disturbances and disorders	pain, post-operative opioid prescription from medical records	preoperative (and perioperative) sleep disturbances and disorders 11/16
Wluka 2020 ⁵¹	To determine whether questionnaire identified neuropathic-like pain and/or sensitization predicts those who are more likely to experience poor outcomes after knee joint replacement	1 (specifically included in search keywords)	neuropathic-like pain or central pain sensitization	pain, function, satisfaction	neuropathic-like pain/pain sensitization 4/6
Zhao 2023 ⁵²	To explore the prognostic value of fear-avoidance beliefs on postoperative pain and back-specific function for patients with lumbar degenerative disk disease	1 (specifically included in search keywords)	fear avoidance beliefs	pain, function	fear avoidance beliefs 6/6

2D: Quality (Q) of evidence, risk of bias (RoB), appraisal tools, and study limitations

Reference	Analysis method	Strength/quality (Q) of evidence for RF association to CPSP	Risk of bias (RoB) and quality (Q) of primary studies	Appraisal tool used for review bias and level of evidence/Quality	main study limitations
Achttien 2021 ¹⁷	narrative synthesis	low certainty evidence	2/16 low RoB, 14/16 high RoB	QUIPS, GRADE	Mixed diagnosis in primary studies, heterogeneity of surgical indications and techniques, Inconsistency between studies of prognostic factors and outcome measures, poor reporting, inability to identify prognostic factors for LSFS for specific diagnoses because of the mixed diagnoses.
Andreoletti 2022 ¹⁸	random effect model, meta-analysis	Quality of evidence low to moderate (low for female sex, low for pain, moderate for younger age)	14/71 high RoB,	QUIPS, GRADE	Heterogeneity of methodologies of primary studies, low sample sizes for 25% of studies, low quality of evidence for sex and preoperative pain risk factors, sample size in most studies was <200.
Ashooron 2023 ¹⁹	sensitivity analysis, meta-analysis	Significant association or younger age and pain catastrophizing; moderate association for female sex, pre-op pain, non-white race, and comorbid diabetes; no significant association for BMI, pre-op ROM (range of motion), and unilateral versus bilateral TKA.	22/30 (73%) high RoB for at least one criterion	GRADE	Assumption in the imputation approach (assuming the correlation between age categories was zero), can exaggerate the variances resulting in a wider confidence interval.
Burns 2015 ²⁰	narrative synthesis	Quality rating between 61 and 86%	Quality rating between 61 and 86%	checklist based on an established quality assessment instrument from the orthopedic literature with 14 quality criteria	Publication bias, meta-analysis not possible due to heterogeneity.
Celestin 2009 ²¹	descriptive analysis	strength of evidence labeled as positive or mixed	not reported	no rating tool reported	Study heterogeneity prevented meta-analytic methods, some studies may have been omitted, difference in indications for spine surgery makes a comparison of findings across studies difficult, use of unvalidated measures of predictor variables and outcome variable
Chidambaran 2020 ²²	descriptive analysis, meta-analysis	marginal	good Q for all studies (scores ranged from 46 to 70 with/without control groups)	STREGA, Q-Genie tool	Heterogeneity in the data and methodology makes it difficult to draw accurate conclusions.
Clephas 2023 ²³	descriptive analysis, sensitivity analysis, meta-analysis	Pre-op pain and ASA physical status have high quality of evidence. other predictors have low (required	high risk for study participation (n=14), high risk for attrition (n=12), high risk outcome measurement	QUIPS, GRADE	Inadequate power reduced the certainty of evidence

		information size not reached).	(n=6), high risk for confounding measures (n=18). outside of confounding overall RoB appears low.		
Compagnoni 2019 ²⁴	narrative synthesis	low, Quality reduced because of limitations	no scores reported	Cochrane handbook guidelines, NOS	Non-randomized observational studies (three retrospective and one prospective) in general provide a low quality of evidence. None of the studies were designed to directly compare two different cohorts (patients with versus without fibromyalgia syndrome). Risk of bias due to several study limitations reduces the quality of evidence.
Denboer 2006 ²⁵	descriptive synthesis	categorized in positive/preliminary, conflicting, or negative/preliminary negative evidence	not rated due to heterogeneity	None used	Small patient sample size in the selected trials can result in an overestimation of the true effects of predictors. Studies used a composite score rather than specific outcomes. Univariate statistics and other methodological issues did not allow for results pooling or study quality assessment.
D'Onghia 2021 ²⁶	descriptive synthesis, meta-analysis, random effects model	reported strong evidence	10/27 good Q, 10/27 fair Q, 7/27 poor Q	NHLBI-NIH	Possible misclassification bias, fibromyalgia diagnosed based on EMR and not validated clinically. Further bias possibly through the use of retrospective cohort studies of moderate quality, based on data from large electronic medical records (EMR) databases.
Dorow 2017 ²⁷	descriptive synthesis	categorized in positive/preliminary, conflicting, or negative/preliminary negative evidence	14/21 fair Q, 7/21 poor Q	Modified DB checklist (scores are divided into 4 quality categories: excellent (26–28), good (20–25), fair (15–19), and poor (<14))	Possible publication bias for missed articles; meta-analysis could not be performed due to the heterogeneity of pain-related data and differences in predictor variables across studies.
Ghoshal 2023 ²⁸	qualitative summary, meta-analysis	younger age, female sex and BMI low strength of evidence; anxiety (state but not trait), depression, and pain catastrophizing high to variable strength, comorbidities high evidence, pain in other parts high evidence,	overall medium to low RoB	alternative method for appraisal based on 3 main criteria	No limitations mentioned
Giusti 2021 ²⁹	narrative synthesis, meta-analysis	high Q supports anxiety, optimism, psychological distress; weak: depression, catastrophizing, mental health, self-efficacy, kinesiphobia,	15/73 high Q, 29/73 medium Q, 29/73 low Q; low RoB: attrition 41/73, predictor measurement 50/73, outcome measurement 63/73, statistical analysis 30/73	QUIPS	Estimates from meta-analyses were based on heterogeneous data sets: studies were different regarding samples, sample characteristics, measurement instruments used to assess predictors and outcomes, follow-up duration, and statistical analyses.
Goplen 2019 ³⁰	random effect	justified (3 papers), not stated (3 papers)	3/6 moderate RoB, 3/6 high RoB	JB critical appraisal check	Low number of studies; use of different analytic approaches,

	model, meta-analysis			list for Cohort Studies	outcome measures and follow-up periods.
Halicka 2022 ³¹	tabular summary, narrative synthesis	moderate evidence Q for symptom duration, low evidence Q for demographic and socioeconomic factors, very low evidence for the neg value of pre-operative pain, comorbidities, depression, anxiety, pain catastrophizing	14/21 high RoB, 7/21 low RoB	QUIPS, GRADE	Quantitative synthesis was not possible because many prognostic factors were only assessed in single studies and the remaining studies were too heterogeneous in terms of analysis types and outcomes and predictor definitions; most studies suffer from uncertain or low evidence.
Hernandez 2015 ³²	descriptive summary	highly variable	moderate Q,	Oxford CEBM quality scale	No limitations mentioned
Hinrichs-Rocker 2009 ³³	tabular summary, narrative synthesis	grade of association (1=association likely, 2=inconclusive, 3=association not likely) was applied to all predictors	not recorded	Evidence grading tool - unclear source	Variability of the existing studies, which precluded formal meta-analysis.
Innocenti 2021 ³⁴	qualitative synthesis	not reported	5/11 low RoB, 6/11 moderate RoB	QUIPS	Absence of a quantitative analysis (meta-analysis) due to substantial heterogeneity in terms of outcome measures and characteristics of the studies included. Studies may have been missed (especially from some grey literature sources) despite comprehensive, PICO-based search analysis.
Lewis 2015 ³⁵	descriptive analysis, meta-analysis	determined in frequency of association to CPSP	moderate RoB (median score of 7, range from 3-10 of 13 max)	custom checklist	Excluded data from studies that combined THA and TKA patients; many predictor variables did not have a sufficient number of analyses to conduct a meaningful meta-analysis; marked heterogeneity in the study designs, statistical analyses, and risk of bias scores.
Lim 2022 ³⁶	descriptive synthesis, meta-analysis	significance reported narratively	breast surgeries: ca 81/126 low, 30/126 unclear, 15/126 high RoB; thoracic surgery: 110/143 low, 26/143 unclear, 7/143 high RoB	use of a three-category rating system	Data on PPSP prevalence were aggregated from studies with various designs, both prospective and retrospective; reporting of PPSP was inconsistent; publication bias cannot be ruled out.
Lungu 2016 ³⁷	descriptive summary	significance reported narratively	moderate-to-high Q (mean score 81.0% ± 10.3% (min=66.7%, max=100%))	modified version of the methodology checklist for prognostic studies. [Hayden JA et al. Ann Intern Med. 2006;144:427-437]	Study heterogeneity limited the pooled assessment of the strength of associations between the preoperative variables and THA outcomes.
McCowat 2019 ³⁸	qualitative data synthesis	Weak/limited for all risk factors	11/12 good Q, 1/12 fair Q	NHLBI-NIH	Possible publication bias; review was limited to prospective studies thus, the role of other psychological factors, assessed in other study designs, may merit future consideration.

McKillop 2014 ³⁹	best evidence synthesis, tabular summary	Mixed strength of evidence	13/13 judged to be scientifically admissible (=reasonable validity)	a critical review form adapted from the Quebec Task Force (QTF) on Whiplash-Associated Disorders	Increasing risk of selection bias through high attrition rates, suboptimal analysis strategies, use of arbitrary and unvalidated cut-off scores for the outcome measures, inadequate sample sizes for the statistical analyses.
Meert 2023 ⁴⁰	tabular summary, narrative synthesis	conflicting evidence	1/49 low; 10/49 moderate; 38/49 high	QUIPS, EBRO	Known confounding factors were not taken into account; many different outcome measures were used; and a widely varying follow-up period.
Moloney 2021 ⁴¹	effect size correlation, meta-analysis, descriptive summary	weak but significant	6/47 high RoB, 19/47 moderate RoB, 21/47 low RoB	NOQAT	The liberal inclusion criteria and the analyses of univariate as well as multivariate associations may have led to stronger pooled effects; inclusion of participants with Stage 0 to Stage 3 cancer with likely different treatment profiles which was not controlled for in these analyses.
Ng 2021 ⁴²	random effects model, meta-analysis	moderate level of evidence	Moderate Quality of evidence for RoB (mean MINORS score was 14.2 (range 11 – 19).)	OCEBM, MINORS	Primarily retrospective data, variable reporting of outcomes in individual studies; inconsistent reporting of confounding factors.
Nunez Cortes 2022 ⁴³	narrative analysis, random effects model, meta-analysis	Depression (moderate), others (association, not further specified)	13/15 low RoB, 2/15 high RoB	QUIPS	Lack of measurement of the cognitive and mental health factors that may influence the CTR outcomes beyond those identified in the available studies; no studies were found evaluating some of the psychosocial factors included in our search strategy (i.e. fear avoidance, kinesiophobia); modulating variables were not considered.
O'Connor 2022 ⁴⁴	tabular summary, narrative synthesis	moderate levels: depression and anxiety; low levels: optimism/pessimism, pain catastrophizing, self-efficacy	4/21 high; 17/21 low	GRADE and RoB criteria	Not adjusting for confounders and failing to address patient attrition.
Olsen 2023 ⁴⁵	random effects model, meta-analysis, qualitative synthesis	low to moderate certainty	low RoB for prognostic factor measurement (n = 16) and outcome measurement (n = 21); high RoB for study participation (n = 12), study attrition (n = 16), and statistical analysis (n = 13)	QUIPS, GRADE	Included studies were largely heterogeneous for measurement of factors; choice of wider eligibility criteria might include more heterogeneity.
Rogowsky 2022 ⁴⁶	narrative (scoping review)	not reported	not reported	None used	Significant differences in patient sample size and post-surgery follow-up timing.
Terradas 2021 ⁴⁷	narrative synthesis	strong evidence: catastrophizing, anxiety, depression; moderate evidence: kinesiophobia, self-efficacy, mental health	RoB not reported; 22/22 good Q with average of 7.22+/- 0.92 (included were only studies with rating >6)	NOS, and for qualitative analysis of selected studies the categorization proposed by Furlan et al was used. [Furlan A et al. Spine	Significant heterogeneity between studies in terms of outcome measurements and statistical analyses.

Theunissen 2012 ⁴⁸	descriptive analysis, random effect model, meta-analysis	small to moderate effect size	RoB not reported; high Q (scoring between 5 and 8: 5 (10%), 6 (42%), 7 (17%) or 8 (31%))	JBI Critical Appraisal Checklist for Cohort/Case-Control studies, and adapted checklist for measuring study quality by DB	The main bias in the review process was related to the heterogeneity in the measurement and reporting of predictors, outcome measures, and in statistical analyses, making comparison of results difficult. The pooled results should be interpreted with caution.
Van Bougaert 2022 ⁴⁹	descriptive synthesis	moderate evidence: pain-related fear; conflicting evidence: catastrophizing, anxiety	high risk of bias	QUIPS	Methodological differences between the included studies were too large to allow performing a relevant meta-analysis; included only patient-reported outcome measures as used by spine registries; the findings cannot be extrapolated to all surgery outcomes following lumbar degenerative disease.
Varallo 2022 ⁵⁰	narrative synthesis, meta-analysis	low certainty of evidence	3/18 low RoB, 1/18 high RoB, 14/18 mixed depending on factor	QUIPS, GRADE	Use of different questionnaires and cutoff scores to evaluate sleep may have captured various aspects of sleep; there is a need for a clear and consistent definition of sleep disturbance and sleep disorders across studies.
Wluka 2020 ⁵¹	narrative analysis, random effects model, meta-analysis	limited evidence	Mixed results in 14 questions, none of the 5 papers was satisfactory in all points	NHLBI-NIH	Low number of included studies; studies did not account for other factors that have been shown to affect pain such as catastrophizing and fear avoidance.
Zhao 2023 ⁵²	fixed effect meta-analysis	not graded but stated low Q due to limited number of studies	3/6 high; 3/6 moderate; overall low Q	modified QUIPS	Low quality of meta-analysis due to limited number of included studies.

Abbreviations: DB: Downs & Black checklist; EBRO: Evidence Based Guideline Development; GRADE: Grading of Recommendations, Assessment, Development and Evaluations tool; MINOR: Methodological Index for Non-Randomized Studies; NHLBI-NIH: National Institutes of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies; NOS: Newcastle–Ottawa assessment scale scores for the included studies; OCEBM: Oxford Centre for Evidence-Based Medicine criteria; QUPIS: Quality In Prognosis Studies; STREGA: Strengthening the REporting of Genetic Association studies.

