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Psychological risk factors for lumbopelvic pain before, during, and after pregnancy: a systematic review

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ABSTRACT

Background: Pregnancy-related lumbopelvic pain (PLPP) affects up to 86% of pregnant women and may persist for many years postpartum. This condition can significantly impact daily activities and the ability to work. While psychological factors may contribute to PLPP, their role during the preconception, prenatal, and postpartum periods remains unclear. This systematic review aimed to identify psychological risk factors for PLPP outcomes across these periods.

Methods: We systematically searched five databases until July 2025 to identify observational studies that report longitudinal associations between psychological factors and PLPP outcomes (e.g., the presence of PLPP, PLPP intensity, and related disability) in women during the preconception, prenatal, and postpartum periods. We assessed the quality of the studies with the Quality in Prognosis Studies

tool and the certainty of evidence with the GRADE criteria. Due to heterogeneity in outcome measures and incomplete data reporting, a narrative synthesis was conducted.

Results: Thirteen prospective, observational studies were included, of which nine showed a moderate risk of bias, and four a high risk. No studies explored preconception psychological risk factors. Limited evidence of low to very low certainty suggests that higher levels of prenatal perceived stress, depression and pain catastrophising, and the presence of emotional distress are associated with worse prenatal PLPP outcomes. Additionally, higher prenatal neuroticism and lower levels of extraversion and conscientiousness may be associated with a greater likelihood of experiencing postpartum PLPP. Postpartum psychological factors did not appear to be associated with postpartum PLPP outcomes. Overall, the certainty of evidence was very low.

Conclusion: Current evidence regarding psychological risk factors for PLPP outcomes during the prenatal and postpartum periods is limited and inconsistent, and no data are available for the preconception period. Future research should use standardised assessment tools, evaluate psychological factors before conception and prior to symptom onset, and investigate broader psychological profiles while considering known risk factors for PLPP to reach stronger conclusions. Strengthening this evidence may lead to more effective care for PLPP.

Trial registration: PROSPERO CRD42025630798

KEYWORDS

Pregnancy, lumbopelvic pain, psychological factors, risk factors, predictive factors, systematic review

BACKGROUND

Pregnancy-related lumbopelvic pain (PLPP), which includes low back pain, pelvic girdle pain, or both, affects up to 86% of pregnant women (1). PLPP typically arises during pregnancy or early postpartum and can significantly impair daily activities, quality of life, and the ability to work (1, 2). Consequently, PLPP is the leading cause of sick leave during and after pregnancy, creating a substantial socioeconomic burden (3, 4). While symptoms often resolve after childbirth, approximately 20% of women continue to report pain three years after delivery, and 10% experience persistent complaints even 11 years postpartum (5, 6).

The underlying mechanisms of PLPP are not fully understood. Previous reviews and a meta-analysis identified several risk factors for PLPP during both prenatal and postpartum periods (7-9). Prenatal risk factors included a history of lumbopelvic pain or trauma to the spine or pelvic girdle, being overweight or obese at the beginning of pregnancy, increased parity, a lower level of education, limited physical activity before pregnancy, and engagement in physically demanding work (7). Postpartum risk factors include a history of lumbopelvic pain before or during pregnancy, a body mass index (BMI) above 25 prior to pregnancy, engaging in physically demanding work during pregnancy, and higher levels of pain and disability during pregnancy (7-9). Furthermore, psychological factors, such as depression and fear-avoidance beliefs during pregnancy, were found to increase the risk of PLPP (7-9). These findings suggest that the aetiology of PLPP is multifactorial, driven by biological, psychological, and social factors and their interactions, akin to other musculoskeletal pain conditions, such as nonspecific low back pain (10, 11).

Several mechanisms have been proposed to explain how psychological factors may contribute to the development and persistence of PLPP (12). Women with increased psychological vulnerability, such as trait or state anxiety, depressive symptoms, or a tendency to catastrophise, may be more susceptible to developing PLPP. This vulnerability may manifest through various mechanisms, including a lowered pain threshold, heightened attention to bodily sensations, a tendency to interpret these sensations

negatively, and anticipatory avoidance of potentially painful activities (12, 13). Once PLPP is present, these same constructs can contribute to the persistence of pain. For example, the fear-avoidance model suggests that pain catastrophising and anxiety can reinforce pain-related fear and avoidance behaviours. These responses can further promote deconditioning, creating a self-perpetuating cycle that maintains pain over time (14). Additionally, depressive symptoms may impair adaptive coping, reduce motivation for recovery, and exacerbate the impact of pain on daily functioning, further contributing to the pain persistence (15).

To date, no reviews have focused explicitly on psychological risk factors for PLPP outcomes. Furthermore, previous reviews often included cross-sectional studies (7, 16), which prevents conclusions regarding temporal relationships, or performed univariable data pooling, overlooking the interactions between multiple psychological and other risk factors (8). Ignoring these interactions restricts insights into potential causal pathways and mechanisms contributing to PLPP. Most reviews have also concentrated solely on prenatal or postpartum PLPP and did not account for the timing of the psychological assessments (7-9). This approach overlooks fluctuations in psychological well-being throughout the perinatal period. For example, pregnant women may face pregnancy-specific stressors, such as fears about childbirth or concerns for their baby's health (17), while postpartum women may face psychological challenges related to the transition into motherhood (18, 19). Additionally, preconception psychological traits, such as general anxiety or depression, may influence how women respond to prenatal or postpartum stressors. However, the psychological factors that serve as risk factors for PLPP outcomes across these periods remain largely unknown.

Therefore, this systematic review aims to provide a comprehensive overview of the psychological risk factors for PLPP outcomes across the preconception, prenatal, and postpartum stages. We will focus on longitudinal studies that performed multivariable analyses to offer more robust evidence on temporal relationships. We hypothesise that multiple psychological factors, measured at different periods, contribute to PLPP outcomes.

METHODS

This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) 2020 guidelines (20) and was registered in the International Prospective Register of Systematic Reviews (PROSPERO, CRD42025630798).

Search strategy

We conducted a systematic search of PubMed, Web of Science, Scopus, Cochrane Library, and Embase from inception until July 2025. The search strategy incorporated four clusters of keywords related to: 1. pregnancy, 2. lumbopelvic pain, 3. psychological factors, and 4. risk factors. The objective was to identify studies that contained at least one keyword from both Cluster 1 and Cluster 2, along with at least one keyword from either Cluster 3 or Cluster 4. The latter clusters were included to ensure a comprehensive search. Psychological factors are not consistently labelled as "risk factors" in titles and abstracts. Additionally, studies examining various types of risk factors may not have emphasised that some of the factors were psychological variables. To capture relevant studies from both perspectives, we used the Boolean operator "OR" between Clusters 3 and 4. To manage irrelevant studies retrieved due to this rather broad search strategy, we applied a structured screening process (see Study selection). The full search strategy for PubMed is provided below and was adapted for the other databases (see Additional file 1).

We did not impose any restrictions regarding article type, language, or publication date. In addition to searching the electronic databases, we manually screened the reference lists of the included studies and relevant reviews.

- Cluster 1: Pregnancy[Mesh] OR pregnant[Title/Abstract] OR pregnancy[Title/Abstract] OR preconception[Title/Abstract] OR "pre-pregnancy"[Title/Abstract] OR prenatal[Title/Abstract] OR prepartum[Title/Abstract] OR postnatal[Title/Abstract] OR postpartum[Title/Abstract] OR Postpartum Period[Mesh] OR peripartum[Title/Abstract]

AND

- Cluster 2: “lumbopelvic pain”[Title/Abstract] OR “Pelvic Girdle Pain”[Mesh] OR “pelvic girdle pain”[Title/Abstract] OR “Pelvic Pain”[Mesh] OR “pelvic pain”[Title/Abstract] OR “Low Back Pain”[Mesh] OR “low back pain”[Title/Abstract] OR “lumbar pain”[Title/Abstract] OR “Back Pain”[Mesh] OR “back pain”[Title/Abstract] OR backache*[Title/Abstract] OR “spinal pain”[Title/Abstract] OR “symphysis pubis pain”[Title/Abstract] OR “pubic symphysis pain”[Title/Abstract] OR “sacroiliac joint pain”[Title/Abstract] OR “LBP”[Title/Abstract] OR “PLPP”[Title/Abstract] OR “PPGP”[Title/Abstract] OR “PLBP”[Title/Abstract] OR “PGP”[Title/Abstract]

AND

- Cluster 3: Psychological[Mesh], OR psychological[Title/Abstract] OR psychosocial[Title/Abstract] OR fear*[Title/Abstract] OR Fear[Mesh] OR “fear of pain”[Title/Abstract] OR “fear of movement”[Title/Abstract] OR “fear-avoidance”[Title/Abstract] OR avoidan*[Title/Abstract] OR “Avoidance Learning”[Mesh] OR Catastrophization[Mesh] OR catastroph*[Title/Abstract] OR Anxiety[Mesh] OR anxiety[Title/Abstract] OR Kinesiophobia[Mesh] OR kinesiophob*[Title/Abstract] OR coping[Title/Abstract] OR “Coping Skills”[Mesh] OR “self-efficacy”[Title/Abstract] OR “Self Efficacy”[Mesh] OR harmful*[Title/Abstract] OR depress*[Title/Abstract] OR Depression[Mesh] OR “Stress, psychological”[Mesh] OR stress[Title/Abstract] OR distress[Title/Abstract] OR Optimism[Mesh] OR optimism[Title/Abstract] OR Pessimism[Mesh] OR pessimism[Title/Abstract] OR emotion*[Title/Abstract] OR Emotions[Mesh] Or hypervigilant*[Title/Abstract] OR belief*[Title/Abstract] OR Perception[Mesh] OR perception*[Title/Abstract] OR expectation*[Title/Abstract] OR Cognition[Mesh] OR cognition*[Title/Abstract] OR Attention[Mesh] OR attention*[Title/Abstract] OR “positive affect” [Title/Abstract] OR “negative affect” [Title/Abstract]

OR

- Cluster 4: “Risk Factors”[Mesh] OR “risk factors”[Title/Abstract] OR “predictive factors”[Title/Abstract] OR predictors[Title/Abstract] OR “prognostic factors”[Title/Abstract] OR “associated factors”[Title/Abstract] OR “influencing factors”[Title/Abstract]

Study selection

All identified studies were imported into Rayyan (Cambridge, MA, USA) for systematic management, and duplicates were removed (21). Two reviewers (MG, EP) independently screened all titles and abstracts based on predefined eligibility criteria, followed by a full-text screening of potentially eligible studies. Disagreements were resolved through discussion with a third reviewer (NG).

Eligible studies were selected using the Population Intervention Comparison Outcome Study (PICOS) framework, adapted for observational designs.

- Population: Women in the preconception, prenatal, and/or postpartum period, assessed at a minimum of two time points for non-specific PLPP. Non-specific PLPP was defined as pain in the lumbar region, sacroiliac joint, gluteal area, posterior thigh, groin, and/or symphysis pubis, which is not caused by any pathological condition (e.g., inflammatory diseases, fractures, osteoporosis, neoplasia, trauma, or gynaecological/urological causes). Studies that offered interventions for PLPP beyond usual care were excluded. The preconception period was defined as any time before pregnancy, the prenatal period as any time during pregnancy, and the postpartum period as any time after delivery.
- Exposure: At least one psychological factor assessed prior to measuring PLPP, reported as binary (e.g., presence/absence) or continuous (e.g., severity) data.
- Comparator: Not applicable.

- Outcome: PLPP outcomes, defined as pain and functional limitations directly attributable to PLPP, measured at a later time point relative to the psychological assessment, and reported as binary (e.g., presence/absence of PLPP) or continuous (e.g., PLPP intensity) data.

  Studies had to report multivariable, longitudinal analyses examining associations between psychological factors and PLPP outcomes, with statistical measures such as odds ratios (OR), beta coefficients (β), or similar effect estimates.
- Study design and publication type: Prospective observational studies that were peer-reviewed and published in English, Dutch, French, Spanish, or Portuguese were included. Non-original research (e.g., reviews), cross-sectional studies, single case reports, conference abstracts, or posters were excluded.

Quality assessment

Risk of bias was independently assessed by three reviewers (MG, EP, EG) with the Quality in Prognosis Studies (QUIPS) tool (22), as recommended by the Cochrane Prognosis Methods Group (23). Any disagreements were resolved through discussion with a fourth reviewer (NG). The QUIPS tool evaluates six domains: study participation, study attrition, prognostic factor measurement, outcome measurement, study confounding, and statistical analysis and reporting. Each domain was rated as having a low, moderate, or high risk of bias based on predefined scoring criteria that were derived from previous systematic reviews investigating psychological factors in individuals with low back pain (24, 25). The detailed criteria can be found in Additional file 2.

Data extraction

Data extraction was performed independently by three reviewers (MG, EP, EG) using a standardised data extraction table. Any discrepancies were resolved in consultation with a fourth reviewer (NG). For each study, we collected the following information: 1. study design and measurement points; 2. characteristics of the sample, including sample size, age, BMI, parity/gravidity, educational level, physical activity level, physical job demands, history of lumbopelvic pain, history of trauma to the spine

or pelvic girdle, and higher levels of pain and disability during pregnancy. These variables were extracted because they have previously been identified as risk factors for PLPP in the literature; 3. psychological factor, including the assessment tool used and the timing of assessment; 4. PLPP outcome, including the assessment tool and timing of assessment; 5. key covariates and other covariates. Key covariates were previously identified risk factors for PLPP in the literature, such as history of lumbopelvic pain, pre-pregnancy BMI above 25, increased parity; and 6. results regarding associations, including the main results for the longitudinal associations, strength of the association in the final multivariable models (e.g., adjusted odds ratios, adjusted beta coefficients, or similar effect estimates), corresponding confidence intervals, significance of the findings (p-value), and covariates included in the final multivariable models. The complete data extraction table is shown in Additional file 3.

Data synthesis

In collaboration with the Center for Statistics (CENSTAT) of UHasselt, we explored the feasibility of conducting a meta-analysis. However, data pooling was not possible due to significant heterogeneity in outcome measures and assessment tools across the studies, along with missing or incompletely reported statistical information. We attempted to contact the corresponding authors for additional data, but responses were limited. For emotional distress, small-scale meta-analyses appeared theoretically viable. However, despite several studies investigating this factor, heterogeneity prevented the inclusion of at least three comparable studies. Consequently, such analyses were deemed to have limited added value, and findings were synthesised narratively.

For several studies, adjusted effect estimates for psychological risk factors were not reported because these variables were not included in final multivariable models (e.g., because they were not significant in relative importance analyses (26), correlation analyses (27, 28), or univariable regression analyses (29, 30)). In these cases, we interpreted the findings as indicating no evidence of an association, which we summarised narratively in our synthesis. Moreover, in some studies, the authors mentioned that

multivariable analyses were conducted, but they did not provide any numerical effect estimates (28, 30, 31). We reached out to the corresponding authors for additional information; when there was no response, we based our conclusions on the textual descriptions found in the original studies.

Based on the studies we included, we categorised the psychological factors as follows: 1. prenatal psychological risk factors for prenatal PLPP, 2. prenatal psychological risk factors for postpartum PLPP, and 3. postpartum psychological risk factors for postpartum PLPP. To further facilitate synthesis, we grouped related subtypes of psychological factors within broader psychological constructs. For example, general depression and postpartum depression were classified under 'depression'. Similarly, fear-avoidance beliefs and kinesiophobia were grouped under 'pain-related fear'. This approach was also applied to various subtypes of anxiety and emotional distress. However, we avoided merging psychological constructs, such as anxiety, depression, emotional distress, and perceived stress into a single category. Although these constructs often interact and may share some overlapping mechanisms, the included studies assessed and reported them as distinct variables (26, 30, 32). To remain consistent with the methodologies used in these studies, and because each construct may involve different underlying mechanisms, we maintained these distinctions in our synthesis.

Certainty of evidence

Two reviewers (MG, EP) independently assessed the certainty of evidence using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) criteria (33). Any disagreements were resolved through discussion with a third reviewer (NG). Since all included studies were observational, we initially rated the certainty of evidence as low. We downgraded the certainty to very low if more than 50% of participants came from studies with a high risk of bias, based on QUIPS scores. Downgrading also occurred when we noted inconsistencies in results across studies that could not be explained by clinical or methodological heterogeneity or when indirectness related to the research question or PICOS criteria was present (e.g., missing data on the longitudinal associations). We downgraded certainty for imprecision when fewer than 100 participants were analysed or when

confidence intervals (CI) were wide. Additionally, if only a few studies addressed a particular outcome, and those studies were industry-funded, we downgraded the certainty due to the potential influence of commercial sponsorship on the results. Conversely, we upgraded the certainty of evidence when we observed large associations with narrow confidence intervals (34).

Deviations from protocol

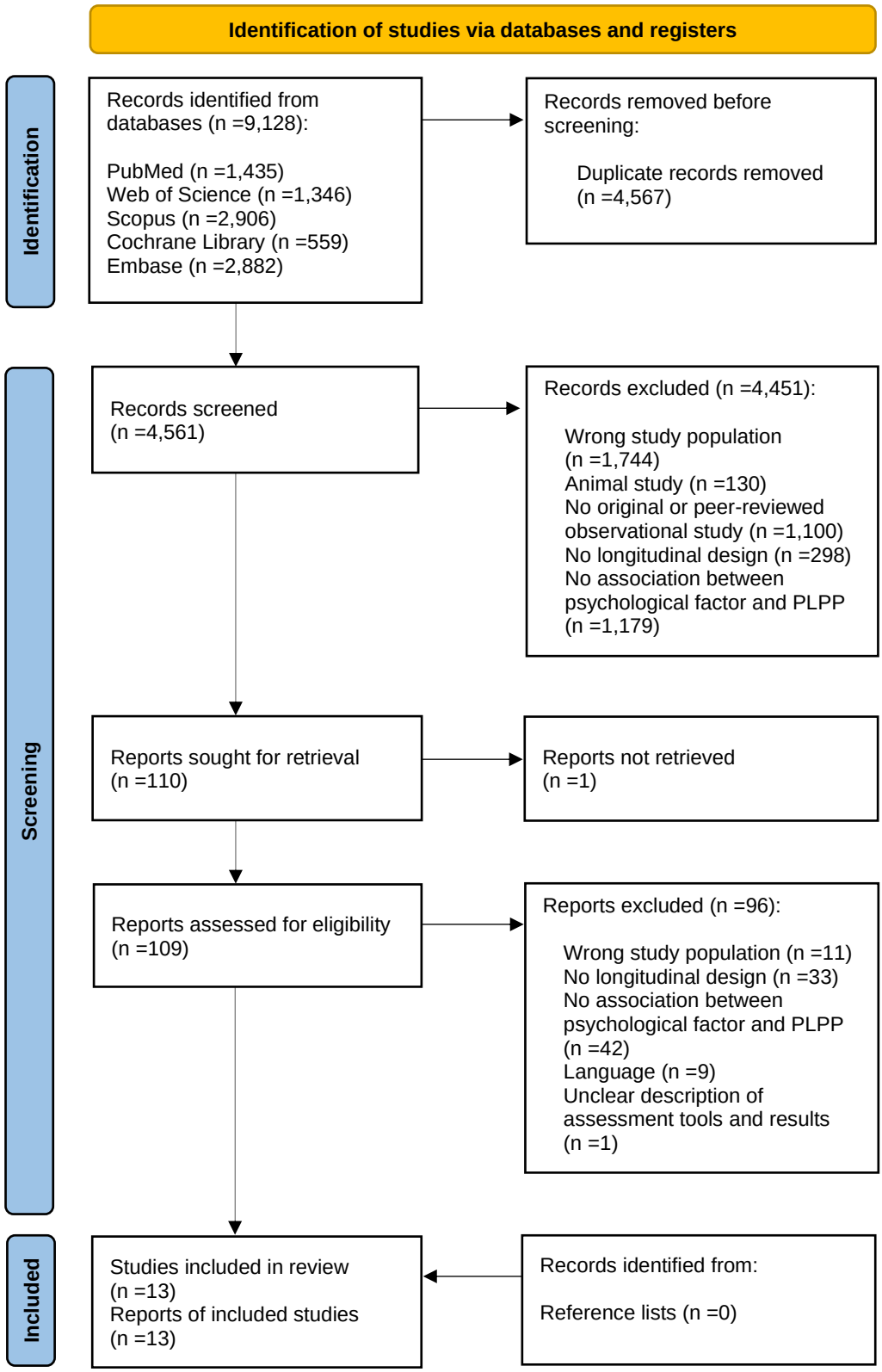
A minor deviation from the PROSPERO-registered protocol was made; we added one author (EG) and appointed a different researcher as the fourth reviewer (NG).

RESULTS

Study selection

The search strategy yielded a total of 9,128 records, of which 4,561 were unique. After screening the titles and abstracts, 4,451 studies were excluded. The full texts of 110 records were sought for retrieval; however, one could not be obtained. Screening of the remaining 109 full-texts resulted in 14 eligible studies. One of these 14 studies (Gausel et al. (35)) was excluded due to unclear reporting of the assessment tools and results, resulting in 13 studies included in the review. A manual search of the reference lists of the included studies, as well as those of relevant reviews, yielded no additional relevant articles (see Figure 1).

Figure 1. PRISMA 2020 flow diagram of search results.



Characteristics of the included studies

Among the 13 studies, we classified nine as having a moderate risk of bias (26, 27, 30, 31, 36-40), and four as having a high risk of bias (28, 29, 32, 41). Most studies showed a high risk of bias related to study participation and study confounding. This was primarily due to an inadequate description of the study sample's key characteristics at baseline (26, 28-32, 36, 37, 40, 41) and the failure to account for important confounders, such as history of trauma to the spine or pelvic girdle and physical activity levels (27-30, 32, 36, 38, 41). Most studies were rated as having a low risk of bias in terms of outcome measurement. However, the risk of bias related to study attrition, the measurement of prognostic factors, and the statistical analysis and reporting varied across studies. Table 1 provides an overview of the QUIPS risk of bias assessment, while Additional File 2 contains a detailed assessment for each included study.

Table 1. QUIPS risk of bias assessment.

	Study participation	**Study attrition**	**Prognostic factor measurement**	**Outcome measurement**	**Study confounding**	**Statistical analysis and reporting**	**Overall score**
Algard et al., 2023 (38)	Moderate	Low	Low	Low	High	Low	**Moderate**
Bakker et al., 2013 (32)	High	High	High	Low	High	Moderate	**High**
Bjelland et al., 2010 (37)	High	Low	Moderate	Low	Moderate	High	**Moderate**
Bjelland et al., 2013 (36)	High	High	Low	Low	High	Moderate	**Moderate**
Chang et al., 2014 (39)	Low	Moderate	High	Low	Moderate	Low	**Moderate**
Ertmann et al., 2023 (26)	High	Low	Moderate	High	Moderate	Low	**Moderate**
Fernando et al., 2020 (41)	High	High	Moderate	High	High	Low	**High**
Girard et al., 2020 (27)	Moderate	Low	Low	Low	High	High	**Moderate**
Olsson et al. 2012 (29)	High	High	High	Moderate	High	Low	**High**
Robinson et al., 2010 (31)	High	Low	Moderate	Low	Moderate	Moderate	**Moderate**

Robinson et al., 2010b (28)	High	High	Moderate	Low	High	Moderate	**High**
Stomp-van den Berg et al., 2012 (30)	High	Low	Low	Low	High	Moderate	**Moderate**
Xiangsheng et al., 2021 (40)	High	Low	Moderate	Low	Moderate	Low	**Moderate**

The overall score is classified as low if ≥ 4/6 domains, including 'study confounding' and 'statistical analysis and reporting', are rated low; as moderate if 4 domains are rated low without including these two domains, or if 2-3 domains are rated low; and as high if ≤ 1 domain is rated low.

Study design and sample characteristics

All included studies were observational, prospective cohort studies conducted in Canada (27), China (40), Denmark (26), Norway (28, 31, 36, 37), Sweden (29, 38, 41), the Netherlands (30, 32), and Taiwan (39), published between 2010 and 2023. Sample sizes varied considerably, ranging from 32 to 107,381 participants included in the study and from 27 to 75,939 participants included in the analyses. None of the studies conducted psychological assessments before conception. Six of the 13 studies exclusively assessed women in the prenatal period (26, 31, 32, 37-39). Six studies included both prenatal and postpartum assessments (28-30, 36, 40, 41), and two studies performed postpartum assessments (25, 28). Findings from three longitudinal studies were published in two articles, each covering different time points (28, 29, 31, 36, 37, 41).

Eleven out of the 13 studies reported the mean age of the participants, which ranged from 26.2 (standard deviation [SD] 4.3) to 33.3 years (SD 4.0). The two remaining studies did not provide a mean age (26, 29). All 13 studies included both primiparous and multiparous women (26-32, 36-41). Furthermore, two studies controlled for one or two key covariates (26, 27), while nine studies accounted for four to five key covariates (28, 29, 32, 36, 38, 40, 41). The remaining four studies controlled for six key covariates (30, 31, 37, 39). A table detailing all study characteristics and covariates can be found in Additional File 3.

Psychological factors

Thirteen psychological factors were assessed across the included studies. The assessment tools measured either symptom severity on a continuous scale or the presence of symptoms as categorical variables. Emotional distress was the most frequently examined factor, assessed in six out of the 13 studies (28, 30-32, 36, 37). Five studies examined pain-related fear (27-29, 31, 41), while depression (26, 30, 38, 39) and anxiety (26, 27, 30, 32) were each investigated in four studies. Across studies, different questionnaires were used to assess emotional distress, pain-related fear, depression, and anxiety, capturing various subtypes of these constructs. Additionally, three studies evaluated pain catastrophising (29, 39, 41), and two studies examined coping strategies (30, 32). Lastly, perceived stress (32), personality traits (i.e., neuroticism, openness to experience, extraversion, conscientiousness, and agreeableness) (40), and previous psychological difficulties (26) were measured in one study each. A detailed overview of how each psychological factor was measured, along with the timing, is shown in Table 2.

*****INSERT TABLE 2*****

Pregnancy-related lumbopelvic pain

Similar to the assessment of the psychological factors, various methods were used to evaluate PLPP. Seven out of the 13 studies measured the presence of PLPP as a categorical variable (26, 29, 30, 36, 37, 40, 41). The remaining six studies examined PLPP on a continuous scale. Four studies measured PLPP intensity (27, 28, 31, 39), and four studies evaluated disability due to PLPP (27, 28, 31, 32), again using different questionnaires. Finally, PLPP interference (39), PLPP provocation (38), and PLPP frequency (27) were measured in one study each. A detailed overview of how and when PLPP was measured in each study is presented in Table 2.

Certainty of evidence

The certainty of evidence regarding the associations between psychological factors and PLPP outcomes ranged from very low to low. The main reasons for downgrading the certainty included indirectness and imprecision. Indirectness often arose because effect estimates from the longitudinal analyses were not reported. Imprecision led to downgrading when confidence intervals were wide or when sample sizes were small. Study limitations, as indicated by poor QUIPS scores, also contributed to downgrading. In many cases, it was not possible to formally assess inconsistency and imprecision, as associations were only examined in single studies or because of missing data. As a result, these domains were often rated as "not applicable". No associations met the criteria for upgrading the certainty of evidence. A detailed overview of the GRADE assessments is provided in Table 3.

*****INSERT TABLE 3*****

Main results from the included studies

Prenatal psychological risk factors for prenatal PLPP outcomes

Six studies examined the association between psychological factors measured during the prenatal period and PLPP outcomes later in pregnancy (26, 31, 32, 37-39) (see Table 4).

One study indicated that higher levels of prenatal perceived stress were associated with increased disability due to PLPP later in pregnancy (32). Regarding emotional distress, three studies found that its presence during pregnancy was associated with higher odds of experiencing PLPP (37), as well as with greater disability due to PLPP later in pregnancy (31, 32). However, in one of these studies, the association between emotional distress and disability was no longer significant when the analyses were adjusted for baseline disability scores, nor did they find an association with PLPP intensity (31).

The findings concerning depression are mixed. One study found that higher levels of prenatal depression were associated with increased PLPP provocation later in pregnancy (38), while another study found no association with the presence of PLPP later in pregnancy (26). A third study reported

an association between higher levels of prenatal depression and greater PLPP interference later in pregnancy, but not with PLPP intensity (39).

Regarding prenatal anxiety, two studies observed no association with either the presence (26) or disability due to PLPP (32) later in pregnancy. Moreover, neither prenatal problem-focused nor emotion-focused coping strategies were associated with disability due to PLPP later in pregnancy (32). Similarly, one study found no association between prenatal pain-related fear and PLPP intensity or disability due to PLPP later in pregnancy (31). One study reported that higher levels of prenatal pain catastrophising were associated with increased PLPP intensity and interference later in pregnancy (39). Moreover, previous prenatal psychological difficulties were found to be associated with higher odds of PLPP presence in the second trimester, but only in women who sought treatment, and not in the third trimester (26).

Overall, the certainty of evidence for most associations was very low. For the role of emotional distress in the presence of PLPP, the relationship of depression with PLPP provocation, and the influence of pain catastrophising on PLPP intensity and interference, the certainty of evidence was rated as low (see Table 3). In summary, low to very low certainty of evidence suggests that higher levels of prenatal perceived stress, depression and pain catastrophising, and the presence of emotional distress may be associated with worse prenatal PLPP outcomes.

Table 4. Overview of psychological risk factor by PLPP outcome and time period

	Prenatal psychological risk factors for prenatal PLPP outcomes	Prenatal psychological risk factors for postpartum PLPP outcomes	Postpartum psychological risk factors for postpartum PLPP outcomes
Presence of PLPP	**Association** - Emotional distress (37)	**Association** - Neuroticism (40) - Extraversion (40) - Conscientiousness (40)	**No association** - Emotional distress (30) - Depression (30) - Anxiety (30)
	No association - Depression (26) - Anxiety (26)	**No association** - Depression (30) - Anxiety (30) - Coping (30) - Openness to experience (40) - Agreeableness (40)	

	Inconsistent results - Previous psychological difficulties (risk factor: yes and I did seek treatment [second trimester] (26); no risk factor: yes, but I did not seek treatment [second and third trimester](26); Yes and I did seek treatment [third trimester] (26))	**Inconsistent results** - Emotional distress (risk factor (36), no risk factor (30)) - Pain catastrophising (risk factor (29), no risk factor (29, 41)) - Pain-related fear (risk factor (41), no risk factor (29))	
PLPP intensity	**Association** - Pain catastrophising (39) **No association** - Emotional distress (31) - Depression (39) - Pain-related fear (31)	**No association** - Emotional distress (28) - Pain-related fear (28)	**No association** - Anxiety (27) - Pain-related fear (27)
Disability due to PLPP	**Association** - Perceived stress (32) **No association** - Anxiety (32) - Coping (32) - Pain-related fear (31) **Inconsistent results** - Emotional distress (risk factor (31, 32), no risk factor (31))	**No association** - Emotional distress (28) - Pain-related fear (28)	**No association** - Anxiety (27) - Pain-related fear (27)
PLPP interference	**Association** - Depression (39) - Pain catastrophising (39)		
PLPP frequency			**No association** - Anxiety (27) - Pain-related fear (27)
PLPP provocation	**Association** - Depression (38)		

Abbreviations: PLPP: pregnancy-related lumbopelvic pain

Prenatal psychological risk factors for postpartum PLPP outcomes

Six studies investigated whether psychological factors assessed during pregnancy were associated with postpartum PLPP outcomes (28-30, 36, 40, 41) (see Table 4).

Findings on prenatal emotional distress are inconsistent. Two out of three studies found no association with the presence of postpartum PLPP, PLPP intensity, or disability due to PLPP (28, 30), while one study reported an association with higher odds of experiencing postpartum PLPP (36).

In one study, prenatal depression, anxiety, and passive coping strategies showed no association with the presence of postpartum PLPP (30). Pain catastrophising was measured in two studies; one reported no association with the presence of postpartum PLPP (41), while another study found that women with PLPP during pregnancy who showed prenatal catastrophising had an increased risk of experiencing postpartum PLPP (29), a risk not observed in women without PLPP during pregnancy (29).

Findings on pain-related fear were also inconsistent. One out of three studies reported that higher levels of prenatal pain-related fear were associated with greater odds of experiencing postpartum PLPP (41). In contrast, two other studies observed no such association with the presence of postpartum PLPP (29), PLPP intensity, and disability due to PLPP (28). Lastly, one study assessing prenatal personality traits found that higher neuroticism was associated with greater odds of experiencing postpartum PLPP, whereas greater levels of extraversion and conscientiousness were associated with lower odds (40). Openness to experience and agreeableness were not associated with the presence of postpartum PLPP (40).

Overall, the certainty of evidence for most associations was very low. For the role of personality traits and coping strategies in the presence of PLPP, the certainty of evidence was rated as low (see Table 3). In summary, low certainty of evidence suggests that higher levels of prenatal neuroticism and lower levels of extraversion and conscientiousness may be associated with the presence of postpartum PLPP.

Postpartum psychological risk factors for postpartum PLPP outcomes

Two studies examined the association between psychological factors assessed postpartum and PLPP outcomes later in the postpartum period (27, 30) (see Table 4).

Regarding postpartum emotional distress and depression, one study found no association with the presence of PLPP later in the postpartum period (30). Both studies reported that postpartum anxiety was not associated with the presence of PLPP, disability due to PLPP, PLPP intensity, and PLPP frequency later in the postpartum period (27, 30). Lastly, one study found that postpartum pain-

related fear was not associated with disability due to PLPP, PLPP intensity, and PLPP frequency later in the postpartum period (27).

The certainty of evidence for all associations was very low, except for the association between emotional distress and the presence of PLPP, which was rated as low (See Table 3). In summary, very low to low certainty of evidence suggests that postpartum emotional distress, depression, anxiety, and pain-related fear may not be associated with postpartum PLPP outcomes.

DISCUSSION

This systematic review offers a comprehensive overview of the longitudinal evidence regarding psychological risk factors for PLPP outcomes across the preconception, prenatal, and postpartum periods. While the aim was to explore all three stages, we found evidence only for prenatal and postpartum assessments. A total of 13 psychological factors were examined across 13 studies, but relationships between these factors and specific PLPP outcomes were rarely assessed in more than one study, with most exhibiting moderate to high risk of bias. As a result, the overall certainty of evidence is very low. The higher risk of bias mainly stemmed from issues related to study participation and confounding, and several studies did not adjust for baseline PLPP status. This makes it challenging to draw causal conclusions; it remains unclear whether the observed associations reflect true effects of the psychological factors or pre-existing differences between groups with and without PLPP. Given these significant methodological limitations, findings should be interpreted cautiously.

Psychological risk factor-PLPP outcome pairs examined in multiple studies

For PLPP later in pregnancy, only one of the eight prenatal psychological factors (i.e., emotional distress) was examined in relation to the same specific PLPP outcome across two studies, with inconsistent findings. In relation to postpartum PLPP, only three of the 12 prenatal psychological factors (i.e., emotional distress, pain-related fear, and pain catastrophising) were assessed concerning

the same PLPP outcome across two studies, again yielding inconsistent results. These inconsistencies may be partly explained by heterogeneity in baseline PLPP status. Studies differed in whether they included women with PLPP (27-29, 40), without PLPP (29, 36, 38), or mixed samples at baseline (26, 30-32, 36, 37, 39, 41), and baseline PLPP was not consistently accounted for in the longitudinal analyses (30, 32, 37). However, in several studies, the presence or absence of an association appeared to depend on the baseline PLPP status or adjustment for baseline PLPP in the analyses (29, 31). Furthermore, these methodological limitations not only hindered the drawing of causal conclusions, but they also made it difficult to distinguish between risk factors for the presence versus the persistence of PLPP. Differences in assessment tools, the timing of assessments, statistical modelling (e.g., treating risk factors continuously vs. categorically), and covariates across studies may further contribute to variability.

Our findings regarding pain-related fear during pregnancy contrast with previous reviews suggesting a strong predictive role for postpartum PLPP (9); however, this latter conclusion relied on a single study (41) without considering conflicting evidence (29). Notably, none of the four postpartum psychological factors examined in relation to postpartum PLPP were investigated across multiple studies.

Psychological factor-PLPP outcome pairs examined in one study

Most pairs of psychological factors and PLPP outcomes were examined in one study each. While evidence from a single study provides limited support, several important observations can still be made. Whether an association was observed seemed to depend on the specific PLPP outcome assessed. As different PLPP outcomes reflect distinct constructs, it is not surprising that a psychological factor may relate to one outcome but not another. Including multiple PLPP outcomes, such as disability, is clinically meaningful, since many interventions aim to improve functional ability rather than just reduce PLPP intensity. Additionally, previous prenatal psychological difficulties seemed to be associated with greater odds of experiencing PLPP later in pregnancy, but only in the second trimester

for women seeking treatment (26), suggesting that the presence of PLPP as an outcome may not be specific enough to identify risk factors.

For some pairs examined in only one study, our findings differed from those of previous reviews. For instance, Wuytack et al. (7) concluded that prenatal emotional distress, depression, and anxiety were associated with the presence of prenatal PLPP. In contrast, our review found a possible association only with emotional distress (37). Their conclusions were mainly based on cross-sectional data and did not incorporate several key longitudinal studies investigating other PLPP outcomes (i.e., Algard et al. (38), Bakker et al. (32), Chang et al. (39), Ertmann et al. (26), Robinson et al. (31)). Moreover, our review suggests that prenatal depression may not be associated with experiencing postpartum PLPP, which contradicts the findings of Wiezer et al. (8). However, this meta-analysis relied on univariate data pooling and did not adjust for multivariable findings. Our results regarding prenatal personality traits were consistent with Burani et al. (9).

Temporal dynamics of psychological risk factors for prenatal and postpartum PLPP outcomes

Our review identified four psychological factors (e.g., emotional distress, depression, anxiety, and pain-related fear) assessed for the same PLPP outcome across the three categories (i.e., prenatal psychological risk factor for prenatal PLPP, prenatal psychological risk factor for postpartum PLPP, and postpartum psychological risk factor for postpartum PLPP). Depression, anxiety, and pain-related fear do not appear to have time-dependent effects, whereas emotional distress shows varying associations across these categories. While comparing the relative influence of psychological risk factors across stages was not the primary focus of our review, exploring this further could be valuable.

Notably, no studies explored preconception psychological factors related to PLPP, even though investigating the preconception period could provide essential baseline data against which changes during the prenatal and postpartum periods can be assessed. This would clarify whether observed associations truly relate to prenatal or postpartum factors or reflect long-lasting psychological traits.

Moreover, research indicates that preconception depression and anxiety are linked to adverse maternal outcomes, such as hypertensive disorders and preeclampsia during pregnancy (42, 43), and that mental health problems that arise before pregnancy often persist or worsen during pregnancy (44). Therefore, it is plausible that preconception psychological factors may also contribute to PLPP.

Despite its relevance, preconception research remains scarce, hindered by structural and methodological barriers. Recruiting women before pregnancy is inherently challenging due to unplanned pregnancies, low response rates to outreach, and a substantial proportion of enrolled women not becoming pregnant. Therefore, preconception trials often require lengthy and costly follow-up periods (45). Healthcare system factors also play a role: standardised preconception care pathways are often lacking, and health professionals feel uncertain about their roles due to time, resources, and guidance constraints (46). Even when women are enrolled before conception, capturing data in the narrow peri-conceptional window is difficult (47). Addressing these issues is crucial for future research.

Possible underlying mechanisms for the contributions of psychological factors to PLPP

The current evidence does not provide strong support for identifying specific psychological risk factors for the development or persistence of PLPP. However, exploring which particular psychological factors may influence PLPP can yield important insights. Conceptual models such as the diathesis-stress model and the fear-avoidance model are frequently used to explain these mechanisms (12). The diathesis-stress model emphasises pre-existing vulnerabilities, such as state and trait anxiety, depression, and neuroticism. These vulnerabilities can interact with stressful events to trigger maladaptive responses, including catastrophising, pain-related fear, and avoidance (48). In contrast, the fear-avoidance model emphasises how these maladaptive responses can create a dynamic cycle of fear, avoidance, and physical deconditioning, which maintains or exacerbates pain over time (14). Together, these models help explain mechanisms underlying pain development (vulnerability to maladaptive responses) and pain persistence (reinforcement of maladaptive responses).

Psychological factors often co-occur and interact, as suggested by these conceptual models. Although constructs such as emotional distress, depression, anxiety, and perceived stress are related, they represent conceptually distinct phenomena: emotional distress reflects general negative affect, depression represents a more specific clinical syndrome, and anxiety is characterised by heightened vigilance and worry. Perceived stress, in turn, reflects the subjective appraisal of stress. These overlapping but distinct features may contribute to inconsistencies in the literature, as studies examining psychological factors in isolation may underestimate their combined effects. Only a limited number of studies have analysed multiple factors simultaneously (26, 28-31, 39, 41). Broader profiling of psychological characteristics could provide deeper insight into how these mechanisms collectively influence PLPP.

Nevertheless, in the context of clinical implications, it is important not to treat all psychological factors as a single entity. Depression and anxiety are generally managed using different approaches, and trait and state factors may call for different strategies. For instance, individuals with high trait psychological factors, which reflect relatively stable and enduring tendencies such as neuroticism, general depression, and a predisposition to catastrophising, may require long-term and more intensive interventions. In contrast, state psychological factors are context-dependent and fluctuate in response to situational stressors, such as pregnancy-related bodily changes, and may be addressed through context-specific strategies. Unfortunately, many studies rely on questionnaires that do not distinguish between trait and state constructs, such as the Pain Catastrophizing Scale and the Patient Health Questionnaire, which complicates interpretation (49). One study used the State-Trait Anxiety Inventory, which is designed to differentiate state and trait anxiety. However, they did not report separate scores, making it difficult to determine their distinct roles in PLPP (27).

Beyond psychological models, the biopsychosocial model emphasises interactions between psychological, biological, and social factors. Psychological factors can influence pain not only through cognitive and behavioural pathways but also through biological mechanisms, such as elevated cortisol,

immune system alterations, and increased inflammatory markers, which may enhance pain sensitivity (12). For example, a woman with high perceived stress may show a stronger inflammatory response during pelvic load, contributing to the development or persistence of pain. While this model provides a more comprehensive understanding of pain mechanisms, its clinical implementation is challenging due to the complexity and variability of contributing factors (12).

Finally, social context may play a crucial role. All included studies are conducted in high- or upper-middle-income countries. This limits the cross-cultural generalisability of our findings, as factors such as availability and quality of social support, maternity leave policies, and access to prenatal and postpartum care differ across settings and may profoundly influence both psychological experiences and PLPP outcomes. For instance, many of the included studies are conducted in countries with well-developed social support systems, such as Sweden and Norway, where extended, well-compensated parental leave is available (50). Such policies may promote psychological well-being by providing emotional security and reducing stress, while also allowing time for physical rest and recovery.

In contrast, in many low- and middle-income countries, women often face economic constraints, limited healthcare infrastructure, lack of family support, insufficiently trained health professionals, and inadequate prenatal and postpartum services (51). These factors may increase perceived stress, anxiety, and depressive symptoms and may also exacerbate physical strain, potentially contributing to the development or persistence of PLPP. Therefore, caution is warranted when generalising our findings to lower-income settings or to countries with different healthcare infrastructures and social policies. Future research should aim to include more diverse populations to better understand how social factors influence both the psychological factors and the PLPP, and also shape the relationship between them.

Unfortunately, there is currently a lack of high-quality research on lumbopelvic pain in low- and middle-income countries (52), despite emerging evidence suggesting a high prevalence of PLPP (53, 54). Barriers such as limited research prioritization, lack of funding, and insufficient training further restrict

scientific knowledge (52, 55). Addressing these barriers is essential to enable future research on PLPP in diverse social contexts.

Strengths and Limitations

This review has several strengths. We conducted a comprehensive search across five databases and focused exclusively on prospective studies with longitudinal analyses. We considered the timing of the psychological assessments in relation to both prenatal and postpartum PLPP outcomes. Additionally, this review included several relevant studies that were not considered in previous reviews, as well as psychological factors, such as coping, that have not been addressed before. These elements offer a nuanced and updated perspective, highlighting the need for caution when interpreting earlier conclusions.

However, important limitations must also be acknowledged. The number of studies per psychological factor and PLPP outcome was small, and considerable heterogeneity existed in the assessment tools used and the timing of the assessments across studies. Due to this heterogeneity, a meta-analysis was not possible. Finally, we were not able to determine which psychological factors truly predict the development versus persistence of PLPP, as the presence of baseline PLPP varied across studies and was not always adjusted for.

Recommendations

This review underlines the need for high-quality, standardised longitudinal studies on the psychological risk factors for PLPP. Future research should use the core outcome set for pelvic girdle pain to improve comparability across studies and enable meta-analyses (56). It is essential to control for known risk factors for PLPP and begin assessments before symptom onset (ideally in the preconception period) to allow for the identification of true risk factors for the development versus persistence of PLPP. Rather than focusing on isolated psychological factors, future studies should assess broader psychological

profiles, integrated into biopsychosocial models. Such integration will help to clarify the complex interactions between psychological, biomechanical, and social factors in PLPP.

Finally, psychological well-being should be monitored early in pregnancy or even before conception, as part of a routine risk assessment in clinical practice. Both trait and state psychological factors should be evaluated. Trait factors may indicate the need for long-term interventions, whereas state factors should be monitored regularly throughout pregnancy and postpartum, as they fluctuate and may respond to context-specific strategies. Currently, management of PLPP often focuses primarily on physical factors (57, 58). In the future, clinicians should interpret these physical factors in conjunction with psychological assessments. Embedding these assessments within a biopsychosocial framework can guide clinical decision-making and support individualised, multidisciplinary management of PLPP in perinatal care.

CONCLUSION

Current longitudinal research on psychological risk factors for PLPP outcomes across the prenatal and postpartum period remains inconclusive, due to methodological variability, limited data, and the generally low methodological quality of the included studies. No data is currently available for the preconception period. While psychological factors may play a role in PLPP, clearer evidence is needed to identify which factors are truly predictive and during which period. Future studies should adopt standardised assessment tools, measure psychological factors before conception and prior to symptom onset, and distinguish between the development and persistence of symptoms. Moreover, psychological profiles, rather than isolated factors, should be examined while considering known risk factors for PLPP. Advancing this knowledge will enable the development of more targeted, personalised prevention and treatment strategies, ultimately improving the care of women experiencing PLPP. Given the current inconsistencies and limited data, clinicians are encouraged to

screen for psychological risk factors early in pregnancy and consider multidisciplinary approaches within a biopsychosocial framework.

LIST OF ABBREVIATIONS

PLPP: Pregnancy-related lumbopelvic pain

BMI: Body mass index

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-analysis

PICOS: Population Intervention Comparison Outcome Study

OR: Odds ratio

β: Beta coefficients

HR: Hazard ratio

QUIPS: Quality in Prognosis Studies

CENSTAT: Center for Statistics

GRADE: Grading of Recommendations, Assessment, Development, and Evaluation

SD: Standard deviation

T1: First trimester

T2: Second trimester

T3: third trimester

Adj: Adjusted

CI: Confidence interval

P4: Posterior Pelvic Pain Provocation

Pp: Postpartum

HADS: Hospital Anxiety and Depression Scale

PSS: Perceived Stress Scale

PRAQ: Pregnancy-Related Anxiety Questionnaire

SCL-90-R: Symptom Checklist-90-Revised

UCL: Utrecht Coping List

OCI: Overall Complaints Index

PMI: Pregnancy Mobility Index

HSCL: Hopkins Symptom Checklist

PCS: Pain Catastrophizing Scale

PHQ: Patient Health Questionnaire

BPI: Brief Pain Inventory

MDI: Major Depression Inventory

ASLR: Active Straight leg raise

ASS: Anxiety Symptom Scale

FABQ: Fear-Avoidance Beliefs Questionnaire

TSK: Tampa Scale of Kinesiophobia

STAI: State-Trait Anxiety Inventory

VAS: Visual Analogue Scale

NRS: Numerical Rating Scale

PGQ: Pelvic Girdle Questionnaire

ODI: Oswestry Disability Index

DRI: Disability Rating Index

4DSQ: Four-Dimensional Symptom Questionnaire

EPDS: Edinburgh Postnatal Depression Scale

QBFPT: Big Five Personality Test

DECLARATIONS

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

All data generated or analysed during this study are included in this published article and its supplementary information files.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

MG conceived and designed the study, collected, analysed, and interpreted the data, drafted the initial manuscript, and substantially revised it. EP and EG collected and analysed the data. DA, IG, LDB, AB, and WG contributed to refining the study design and critically reviewed the manuscript. NG analysed and interpreted the data, substantially revised the manuscript, and supervised. LJ conceived and designed the study, critically reviewed the manuscript, and supervised. All authors read and approved the submitted version and agreed to be personally accountable for their contributions and to ensure the integrity and accuracy of the work.

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Table 2. Key findings.

Authors, year Reference Country	Psychological factor Assessment tool Timing of assessment	PLPP outcome Assessment tool Timing of assessment	Results associations
Algard et al., 2023 (38) Sweden	Depression HADS-D Scale value: 0-21 T1 (mean week 11.6, SD 2.3)	PLPP provocation The P4 test, one side at a time → sum score Scale values: 0-8 T3 (mean week 35.8, SD 1.0)	Higher levels of depression at week 11.6: Associated with increased PLPP provocation in week 35.8 Adj β 0.32, CI 0.16-0.48, p <0.001 Adj β 0.41, CI 0.22-0.60, p <0.001 (History of back or pelvic pain before pregnancy replaced by history of back or pelvic girdle pain in previous pregnancy) Adj for history of back/pelvic girdle pain, high BMI, parity, physical activity level, adverse childhood experiences, age, generalised joint hypermobility, tobacco use, work satisfaction
Bakker et al., 2013 (32) The Netherlands	Perceived stress PSS Scale values: 0-56 Anxiety PRAQ Scale values: 10-70 Emotional distress SCL-90-R Scale values: 90-450 Coping UCL Scale values: Problem-focused coping Emotional-focused coping T1 (week 12), T2 (week 24)	Disability OCI Scale values: 0-15 PMI Scale values: 0-81 T3 (week 36)	Higher levels of stress at week 12 or week 24: Associated with greater disability at week 36 PMI week 12: adj β 0.233, p 0.0004 PMI week 24: adj β 0.347, p 0.003 OCI week 12: adj β 0.134, p 0.092 OCI week 24: adj β 0.319, p 0.004 Adj for parity, education, BMI, back pain before pregnancy, age at delivery Higher levels of stress at week 24: Associated with greater disability at week 36: PMI adj extra model β 0.220, p 0.006 OCI adj extra model β 0.224, p <0.05 Adj for PMI at T2 Higher levels of anxiety at week 12 or week 24: Not associated with disability at week 36 PMI week 12: adj β 0.076, p 0.331 PMI week 24: adj β 0.070, p 0.550 OCI week 12: adj β 0.017, p 0.828 OCI week 24: adj β 0.168, p 0.133 Adj for parity, education, BMI, back pain before pregnancy, age at delivery Higher levels of emotional distress at week 12 or week 24: Associated with greater disability at week 36 PMI week 12: adj β 0.263, p 0.001 PMI week 24: adj β 0.334, p 0.004 OCI week 12: adj β 0.217, p 0.005 OCI week 24: adj β 0.302, p 0.007 Adj for parity, education, BMI, back pain before pregnancy, age at delivery Higher levels of coping at week 12 or week 24: Problem-focused coping: Not associated with disability at week 36 PMI week 12: adj β 0.012, p 0.878

			PMI week 24: adj β 0.074, 0.520 OCI week 12: adj β 0.012, p 0.882 OCI week 24: adj β 0.041, p 0.716 Adj for parity, education, BMI, back pain before pregnancy, age at delivery Emotion-focused coping: Not associated with disability at week 36 PMI week 12: adj β -0.044, p 0.583 PMI week 24: adj β 0.113, p 0.335 OCI week 12: adj β -0.030, p 0.702 OCI week 24: adj β 0.083, p 0.460 Adj for parity, education, BMI, back pain before pregnancy, age at delivery
Bjelland et al., 2010 (37) Norway	Emotional distress HSCL-5 Dichotomised using a cut-off of 2.0 T2 (week 17)	Presence of pain: 1. Question: Do you have pain in the pelvic girdle? 2. Where is the pain located? + PLPP intensity/location (mild/severe) Dichotomised: • PLPP - PLPP: pain in 3 pelvic locations - Severe PLPP: severe pain in all 3 pelvic locations • No PLPP T3 (week 30)	Emotional distress at week 17: Associated with increased odds of presence of PLPP at week 30 Adj OR 1.6, CI 1.5-1.8, p 0.01 Adj for parity, BMI, educational level, previous low back pain, physically demanding work, pregnancy physical activity weekly, maternal age, smoking in pregnancy Associated with increased odds of presence of severe PLPP at week 30 Adj OR 2.0, CI 1.8-2.3, p 0.001 Adj for parity, BMI, educational level, previous low back pain, physically demanding work, pregnancy physical activity weekly, maternal age, smoking in pregnancy
Bjelland et al., 2013 (36) Norway	Emotional distress HSCL-5 1. Dichotomised using a cut-off of 2.0 2. Categorised: • No emotional distress • Emotional distress at 1 time point • Emotional distress at 2 time points T2 (mean week 17.2, SD 2.2), T3 (mean week 30.5, SD 1.4)	Presence of pain: 3. Question: Do you have pain in the pelvic girdle? 4. Where is the pain located? + PLPP intensity/location (mild/severe) Dichotomised: • PLPP - PLPP: pain in 3 pelvic locations - Severe PLPP: severe pain in all 3 pelvic locations • No PLPP 6 months pp (mean week 28.0, SD 3.0)	Emotional distress at week 17: Associated with increased odds of presence of PLPP at 6 months pp Adj OR 1.3, CI 1.1-1.5, p <0.01 Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy Associated with increased odds of presence of severe PLPP at 6 months pp Adj OR 2.0, CI 1.4-2.9, p <0.001 Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy Associated with increased odds of presence of PLPP at 6 months pp Adj OR 1.4, CI 1.1-1.7, p <0.01 (in women with onset of PLPP after week 17) Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy Associated with increased odds of presence of severe PLPP at 6m pp Adj OR 2.3, CI 1.3-4.0, p <0.01 (in women with onset of PLPP after week 17) Adj for BMI, previous low back pain, co-morbidity index, age at menarche,

			smoking during pregnancy, pain severity in pregnancy Emotional distress at week 17 and week 30: Associated with increased odds of presence of PLPP at 6 months pp Adj OR 1.5, CI 1.2-1.9, p <0.001 Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy Associated with increased odds of presence of severe PLPP at 6 months pp Adj OR 1.9, CI 1.1-3.1, p <0.05 Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy Associated with increased odds of presence of PLPP at 6 months pp Adj OR 1.9, CI 1.4-2.6, p <0.001 (in women with onset of PLPP after week 17) Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy Associated with increased odds of presence of severe PLPP at 6 months pp Adj OR 2.3, CI 1.1-4.9, p <0.05 (in women with onset of PLPP after week 17) Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy
Chang et al., 2014 (39) Taiwan	Pain catastrophising PCS Scale values 0-50 Depression PHQ-9 Scale values 1-27 T3 (week 28, SD 2)	Changes in PLPP intensity BPI-PLPP intensity, average over the past week Scale values: NRS 0-10 average over 3 time points Changes in PLPP interference BPI-PLPP interference during the past week Scale values: NRS 0-10 → averaged → composite score average over 3 time points T3 (week 28, SD 2; week 32, SD 2; week 36, SD 2)	Higher levels of pain catastrophising at week 28: Associated with greater changes in PLPP intensity at week 36 Adj β 0.10, CI 0.08-0.12, p <0.001 Adj for low back pain history, physical workload, average PLPP intensity gestational age 24 weeks, social support, depression, pain catastrophising, time Associated with greater changes in PLPP interference at week 36 Adj β 0.06, CI 0.04-0.08, p <0.001 Adj for low back pain history, physical workload, average PLPP intensity gestational age 24 weeks, social support, depression, time, pain catastrophising Higher levels of depression at week 28: not associated with changes in PLPP intensity at week 36 Adj β 0.02, CI -0.02-0.06, p 0.43 Adj for low back pain history, physical workload, average PLPP intensity gestational age 24 weeks, social

			support, depression, pain catastrophising, time Associated with greater changes in PLPP interference at week 36 Adj β 0.10, CI -0.07-0.14, p <0.001 Adj for low back pain history, physical workload, average PLPP intensity gestational age 24 weeks, social support, depression, time, pain catastrophising
Ertmann et al., 2023 (26) Denmark	Depression MDI Dichotomised using a cut-off of 21 Anxiety ASS Dichotomised using a cut-off of 10 Previous psychological difficulties Categorised: • No • Yes, but I did not seek treatment • Yes and I did seek treatment T1 (week 6-10)	Presence of pain Question: PLPP? Yes/no + anatomic pictures Dichotomised • Self-reported PLPP • No self-reported PLPP T2 (week 25), T3 (week 32)	Depression at week 6-10: Not associated with the presence of PLPP in T2 Relative important factor analysis Not associated with the presence of PLPP in T3 Relative important factor analysis Anxiety at week 6-10: Not associated with the presence of PLPP in T2 Relative important factor analysis Not associated with the presence of PLPP in T3 Relative important factor analysis Previous psychological difficulties: Yes, but I did not seek treatment Not associated with the presence of PLPP in T2 Adj OR 1.29, CI 0.94-1.76, p 0.1090 Adj for pelvic girdle pain, vomiting, age, well-being Yes and I did seek treatment Associated with increased odds of presence of PLPP in T2 Adj OR 1.71, CI 1.31-2.24, p 0.0001 Adj for pelvic girdle pain, vomiting, age, well-being Yes but I did not seek treatment Not associated with the presence of PLPP in T3 Relative important factor analysis Yes and I did seek treatment Not associated with the presence of PLPP in T3 Relative important factor analysis
Fernando et al., 2020 (41) Sweden	Pain catastrophising PCS Scale values: 0-52 Pain-related fear FABQ-activity Scale values: 0-24 T3 (week 34-37)	Presence of pain: Question: PLPP? Yes/no Dichotomised: • Self-reported PLPP • No self-reported PLPP 6 months pp	Higher levels of pain catastrophising at week 34-37: Not associated with the presence of PLPP at 6 months pp Adj OR 1.008, CI 0.975-1.042, p 0.648 Adj for Lumbopelvic pain at weeks 19-21, Lumbopelvic pain at weeks 34-37, daily or constant pain during pregnancy, DRI-total score Higher levels of pain-related fear at week 34-37: Associated with increased odds of the presence of PLPP at 6 months pp Adj OR 1.060, CI 1.005-1.118, p 0.033

			Adj for Lumbopelvic pain at weeks 19-21, Lumbopelvic pain at weeks 34-37, daily or constant pain during pregnancy
Girard et al., 2020 (27) Canada	Pain-related fear TSK Scale values: 17-68 Anxiety STAI Scale values: 20-80 Timepoint 1: 3 to 12 months pp (mean months 6.6, SD 2.0)	PLPP intensity reduction Question: Highest pain level over the last 7 days? Scale values: NRS 0-100 (Mean Timepoint 2 - Timepoint 3 – mean Timepoint 1 – Timepoint 2) PLPP frequency reduction Question: Number of days with pain over the last 7 days? Weekly assessed Scale values: NRS 0-7 (Mean Timepoint 2 - Timepoint 3 – mean Timepoint 1 – Timepoint 2) Disability reduction PGQ, ODI Scale values: 0-100 (Mean Timepoint 3 – Timepoint 1) PLPP intensity + interference: weekly between Timepoint 1 and Timepoint 2 (3 months later), Timepoint 2 (3 months later) and Timepoint 3 (6 months later) Disability: Timepoint 1, Timepoint 3	Higher levels of pain-related fear at 6.6 months pp: Not associated with improvement in disability 6 months later PGQ: adj β 0.283, p 0.125 ODI: adj β 0.196, p 0.281 Adj for weight loss at Timepoint 3, Mean steps at Timepoint 3 Not associated with reduction in PLPP intensity 6 months later Adj β: 0.053, p 0.791 Adj for weight loss at Timepoint 3, Mean steps at Timepoint 3 Not associated with reduction in PLPP frequency 6 months later Adj β: 0.003, p 0.990 Adj for weight loss at Timepoint 3, Mean steps at Timepoint 3 Anxiety at 6.6 months pp: Not associated with improvement in disability 6 months later Pearson correlation analysis Not associated with reduction in PLPP intensity 6 months later Pearson Correlation analysis Not associated with reduction in PLPP frequency 6 months later Pearson correlation analysis
Olsson et al., 2012 (29) Sweden	Pain catastrophising PCS Dichotomised using cut-off of 17 Pain-related fear FABQ-activity Dichotomised using cut-off of 12.3 T2 (week 19-21)	Presence of pain: Question: PLPP? Yes/no Dichotomised: • Self-reported PLPP • No self-reported PLPP 6 months postpartum	Pain catastrophising at week 19-21: Associated with a higher risk of the presence of PLPP at 6 months pp in women with LP in weeks 19-21 Adj HR 2.05, CI 1.06-3.98, p 0.034 Adj for DRI-total index >25, exercise during pregnancy, onset of lumbopelvic pain Not associated with the presence of PLPP at 6 months pp in women without LP in weeks 19-21 Univariable regression analysis Pain-related fear at week 19-21: Not associated with the presence of PLPP at 6 months pp in women with LP in weeks 19-21 Univariable regression analysis
Robinson et al., 2010 (31) Norway	Emotional distress HCSL-25 Dichotomised using a cut-off of 1.75 Pain-related fear FABQ-activity Scale values: 0-24 T2 (mean week 14, SD 3)	PLPP intensity of evening pain VAS Scale values: 0-100 Disability DRI Scale values: 0-100 T3 (week 30)	Emotional distress at week 14: Associated with greater disability at week 30 Adj β 8.2, CI 2.3-14.0, p 0.006 Adj for pain location, P4 test, sum of pain provocation tests Not associated with disability at week 30 Adj β 2.0, CI 3.7-7.7, p 0.49

			Adj for pain location, P4 test, sum of pain provocation tests, DRI at baseline Not associated with PLPP intensity at week 30 Adj 1 + 2 (exact values not shown) Adj 1: for pain location, P4 test, sum of pain provocation tests, DRI in early pregnancy, adj 2: for pain location, P4 test, sum of pain provocation tests, PLPP intensity in early pregnancy Higher levels of pain-related fear measured in week 14: Not associated with disability at week 30 Adj 1 + 2 (exact values not shown) Adj 1: for pain location, P4 test, sum of pain provocation tests, DRI in early pregnancy, adj 2: for pain location, P4 test, sum of pain provocation tests, DRI in early pregnancy Not associated with PLPP intensity at week 30 Adj 1 + 2 (exact values not shown) Adj 1: for pain location, P4 test, sum of pain provocation tests, DRI in early pregnancy, adj 2: for pain location, P4 test, sum of pain provocation tests, PLPP intensity in early pregnancy
Robinson et al., 2010b (28) Norway	Emotional distress HCSL-25 Dichotomised using a cut-off of 1.75 Pain-related fear FABQ-activity Scale values: 0-24 T3 (week 30)	PLPP intensity for evening pain VAS Scale values: 0-100 Disability DRI Scale values: 0-100 12 weeks pp	Emotional distress at week 30: Not associated with disability at 12 weeks pp Spearman correlation analysis Not associated with PLPP intensity at 12 weeks pp Spearman correlation analysis Higher levels of pain-related fear at week 30: Not associated with disability at 12 weeks pp Adj (exact values not shown) Adj for pre-pregnancy BMI, Pre-pregnancy low back pain, sum of pain provocation tests, ASLR not associated with PLPP intensity at 12 weeks pp Adj (exact values not shown) Adj for pre-pregnancy BMI, Pre-pregnancy low back pain, sum of pain provocation tests, ASLR
Stomp-van den Berg et al., 2012 (30) The Netherlands	Coping UCL (passive reaction approach) Dichotomised using a cut-off of 11 Emotional distress 4DSQ-distress Scale values: 0-32 Anxiety 4DSQ-anxiety Scale values: 0-24	Presence of pain Question: PLPP? Yes/no Dichotomised: • Self-reported PLPP • No self-reported PLPP 12 weeks pp	Passive coping at week 30: Not associated with the presence of PLPP at 12 weeks pp Adj cluster model psychosocial factors Higher levels of emotional distress at week 30: Not associated with the presence of PLPP at 12 weeks pp Adj cluster model psychosocial factors Higher levels of anxiety levels at week 30:

	Depression EPDS Scale values: 0-30 T3 (week 30), 6 weeks pp		Not associated with the presence of PLPP at 12 weeks pp Univariable regression analysis Higher levels of depression at week 30: not associated with the presence of PLPP at 12 weeks pp Adj (exact values not shown) Adj for history of back/pelvic pain, hours of sleep/rest a day, uncomfortable posture Higher levels of emotional distress at 6 weeks pp: Not associated with the presence of PLPP at 12 weeks pp Adj cluster model psychosocial factors Higher levels of anxiety at 6 weeks pp Not associated with the presence of PLPP at 12 weeks pp Adj cluster model psychosocial factors Higher levels of depression at 6 weeks pp Not associated with the presence of PLPP at 12 weeks pp Univariable regression analysis
Xiangsheng et al., 2021 (40) China	Agreeableness QBFPT Scale values: 6-42 Extraversion QBFPT Scale values: 6-42 Conscientiousness QBFPT Scale values: 6-42 Neuroticism QBFPT Scale values: 6-42 Openness to experience QBFPT Scale values: 6-42 T1 (week 12)	Presence of pain (yes/no): Persistent pain score ≥ 3 over a week (VAS 0-10) Dichotomised using cut-off 3/10 2 years pp	Higher levels of neuroticism at week 12: Associated with increased odds of the presence of PLPP at 2 years pp Adj OR 2.03, CI 1.92-2.13, p 0.002 Adj for parity, education, pelvic girdle pain in previous pregnancy, income, maternal age, no or rare ability to take rest breaks at work Lower levels of extraversion at week 12: Associated with increased odds of the presence of PLPP at 2 years pp Adj OR 0.79, CI 0.71-0.87, p 0.004 Adj for parity, education, pelvic girdle pain in previous pregnancy, income, maternal age, no or rare ability to take rest breaks at work Lower levels of conscientiousness at week 12: Associated with increased odds of the presence of PLPP at 2 years pp Adj OR 0.92, CI 0.87-0.97, p 0.021 Adj for parity, education, pelvic girdle pain in previous pregnancy, income, maternal age, no or rare ability to take rest breaks at work Lower levels of agreeableness at week 12: Not associated with the presence of PLPP at 2 years pp Adj OR 0.88, CI 0.83-0.93, p 0.626 Adj for parity, education, pelvic girdle pain in previous pregnancy, income, maternal age, no or rare ability to take rest breaks at work Higher levels of openness to experience at week 12:

									Not associated with the presence of PLPP for PLPP intensity at 2 years pp Adj OR 1.23, CI 1.12-1.34, p 0.928 Adj for parity, education, pelvic girdle pain in previous pregnancy, income, maternal age, no or rare ability to take rest breaks at work

Abbreviations: T1: first trimester, T2: second trimester, T3: third trimester, PLPP: pregnancy-related lumbopelvic pain, SD: standard deviation, β: beta coefficient, OR: odds ratio, HR: hazard ratio, adj: adjusted, CI: confidence interval, P4: Posterior Pelvic Pain Provocation, BMI: body mass index, pp: postpartum, HADS-D: Hospital Anxiety and Depression Scale - Depression, PSS: Perceived Stress Scale, PRAQ: Pregnancy-Related Anxiety Questionnaire, SCL-90-R: Symptom Checklist -90- Revised, UCL: Utrecht Coping List, OCI: Overall Complaints Index, PMI: Pregnancy Mobility Index, HSCL: Hopkins Symptom Checklist, PCS: Pain Catastrophizing Scale, PHQ: Patient Health Questionnaire, BPI: Brief Pain Inventory, MDI: Major Depression Inventory, ASLR: Active Straight leg raise, ASS: Anxiety Symptom Scale, FABQ: Fear-Avoidance Beliefs Questionnaire, TSK: Tampa Scale of Kinesiophobia, STAI: State-Trait Anxiety Inventory, VAS: Visual Analogue Scale, NRS: Numerical Rating Scale, PGQ: Pelvic Girdle Questionnaire, ODI: Oswestry Disability Index, DRI: Disability Rating Index, 4DSQ: Four-Dimensional Symptom Questionnaire, EPDS: Edinburgh Postnatal Depression Scale, QBFPT: Big Five Personality Test

Table 3. Grade assessment.

Psychological factor	**Effect**	**Number of studies**	**Number of participants**	**Certainty of evidence assessment**					**Certainty of evidence**
				Study limitations	**Inconsistency**	**Indirectness**	**Imprecision**	**Publication bias**	
Perceived stress									
Prenatal Prenatal disability (32)	Positive associations Adj β 0.233, p 0.0004 (PMI week 12) Adj β 0.347, p 0.003 (PMI week 24) Adj β 0.134, p 0.092 (OCI week 12) Adj β 0.319, p 0.004 (OCI week 24) Adj extra model β 0.220, p 0.006 (PMI week 24) Adj extra model β 0.224, p <0.05 (OCI week 24)	1	223	Serious	None	None	Serious	None	**Very low**
Emotional distress									
Prenatal Prenatal presence of PLPP (37)	Positive associations Adj OR 1.6, CI 1.5-1.8, ≤ p 0.001 Adj OR 2.0, CI 1.8-2.3, ≤ p	1	75,939	Not serious	None	None	None	None	**Low**

	0.001 (severe PLPP)								
Prenatal PLPP intensity (31)	No association Adj (exact values not shown)	1	268	Not serious	N/A	Serious	N/A	None	**Very Low**
Prenatal disability (31, 32)	Inconsistent associations Positive associations Adj β 8.2, CI 2.3, 14.0, p 0.006 (not adj for DRI at baseline) Adj β 0.263, p 0.001 (PMI week 12) Adj β 0.334, p 0.004 (PMI week 24) Adj β 0.217, p 0.005 (OCI week 12) Adj β 0.302, p 0.007 (OCI week 24) No association Adj β 2.0, CI -3.7-7.7, p 0.49 (adj for DRI at baseline)	2	491	Serious	Not serious	None	Serious	None	**Very low**
Postpartum presence of PLPP (30, 36)	Inconsistent associations Positive associations Adj OR 1.3, CI 1.1-1.5, p <0.01 Adj OR 2.0, CI 1.4-2.9, p<0.001 (severe PLPP) Adj OR 1.4, CI 1.1-1.7, p<0.01 (in women with onset of PLPP after week 17) Adj OR 2.3, CI 1.3-4.0, p<0.01 (severe PLPP, in women with onset of PLPP after week 17) Adj OR 1.5, 1.2-1.9, p<0.001 (week 17 and week 30) Adj OR 1.9, CI 1.1-3.1, p <0.05 (week	2	41,969	Not serious	Not serious	Not serious	Serious	None	**Very Low**

	17 and week 30) Adj OR 1.9, CI 1.4-2.6, p<0.001 (in women with onset of PLPP after week 17) Adj OR 2.3, CI 1.1-4.9, p<0.05 (in women with onset of PLPP after week 17) No association Adj cluster model								
Postpartum PLPP intensity (28)	No association Correlation analysis	1	179	Serious	N/A	Not serious	Not serious	None	**Very low**
Postpartum disability (28)	No association Correlation analysis	1	179	Serious	N/A	Not serious	Not serious	None	**Very low**
Postpartum									
Postpartum presence of PLPP (30)	No association Adj cluster model	1	548	Not serious	N/A	Not serious	None	None	**Low**
Depression									
Prenatal									
Prenatal presence of PLPP (26)	No association Relative important analysis	1	1,328	Not serious	N/A	Not serious	Serious	None	**Very low**
Prenatal PLPP intensity (39)	No association Adj β 0.02, CI -0.02-0.06, p 0.43	1	214	Not serious	N/A	None	Serious	None	**Very Low**
Prenatal PLPP provocation (38)	Positive associations Adj β 0.32, CI 0.16-0.48, p < 0.001 (history of back pain or pelvic pain before pregnancy) Adj β 0.41, CI 0.22-0.60, p < 0.001 (history of back or pelvic girdle pain in previous pregnancy)	1	214	Not serious	None	None	Not serious	None	**Low**
Prenatal PLPP interference (39)	Positive association Adj β 0.10, CI -0.07-0.14 p<0.001	1	214	Not serious	N/A	None	Serious	None	**Very Low**

Postpartum presence of PLPP (30)	No association Adj (exact values not shown)	1	548	Not serious	N/A	Serious	N/A	None	**Very low**
Postpartum									
Postpartum presence of PLPP (30)	No association Univariable regression analysis	1	548	Not serious	N/A	Serious	N/A	None	**Very low**
Anxiety									
Prenatal									
Prenatal presence of PLPP (26)	No association Relative important analysis	1	1,328	Not serious	N/A	Not serious	Serious	None	**Very low**
Prenatal disability (32)	No associations Adj β 0.076, p 0.331 (PMI week 12) Adj β 0.070, p 0.550 (PMI week 24) Adj β 0.017, p 0.828 (OCI week 12) Adj β 0.168, p 0.133 (OCI week 24)	1	223	Serious	None	None	Serious	None	**Very low**
Postpartum presence of pain (30)	No association Univariable regression analysis	1	548	Not serious	N/A	Serious	N/A	None	**Very low**
Postpartum									
Postpartum presence of PLPP (30)	No association Adj cluster model	1	548	Not serious	N/A	Not serious	Serious	None	**Very low**
Postpartum PLPP intensity (27)	No association Correlation analysis	1	27	Not serious	N/A	Not serious	Serious	None	**Very low**
Postpartum disability (27)	No association Correlation analysis	1	27	Not serious	N/A	Not serious	Serious	None	**Very low**
Postpartum PLPP frequency (27)	No association Correlation analysis	1	27	Not serious	N/A	Not serious	Serious	None	**Very low**
Coping									
Prenatal									
Prenatal disability (32)	No associations Problem-focused coping Adj β 0.012, p 0.878 (PMI week 12) Adj β 0.074, 0.520 (PMI week 24) Adj β 0.012, p 0.882 (OCI week 12)	1	223	Serious	None	None	Serious	None	**Very low**

	Adj β 0.041, p 0.716 (OCI week 24) Emotion-focused coping Adj β -0.044, p 0.583 (PMI week 12) Adj β 0.113, p 0.335 (PMI week 24) Adj β -0.030, p 0.702 (OCI week 12) Adj β 0.083, p 0.460 (OCI week 24)								
Postpartum presence of PLPP (30)	No association Adj cluster model	1	548	Not serious	N/A	Not serious	None	None	**Low**
Pain catastrophising **Prenatal**									
Prenatal PLPP intensity (39)	Positive association Adj β 0.10, CI 0.08-0.12, p<0.001	1	214	Not serious	N/A	None	Not serious	None	**Low**
Prenatal PLPP interference (39)	Positive association Adj β 0.06, CI 0.04-0.08, p<0.001	1	214	Not serious	N/A	None	Not serious	None	**Low**
Postpartum presence of PLPP (29, 41)	Inconsistent associations No associations Adj OR 1.029, CI 1.000-1.059, p 0.648 Univariable regression analysis (in women without PLPP in weeks 19-21) Positive association Adj HR 2.05, CI 1.06-3.98, p 0.034 (in women with PLPP in weeks 19-21)	2	533	Serious	Not serious	Serious	Serious	None	**Very low**
Pain-related fear **Prenatal**									
Prenatal PLPP intensity (31)	No association Adj (exact values not shown)	1	268	Not serious	N/A	Serious	N/A	None	**Very low**
Prenatal disability (31)	No association Adj (exact values not shown)	1	268	Not serious	N/A	Serious	N/A	None	**Very low**

Postpartum presence of PLPP (29, 41)	Inconsistent associations Positive association Adj OR 1.060, CI 1.005-1.118, p 0.033 No association Univariable regression analysis	2	533	Serious	Not serious	Not serious	Serious	None	**Very low**
Postpartum PLPP intensity (28)	No association Adj (exact values not shown)	1	179	Not serious	N/A	Serious	N/A	None	**Very low**
Postpartum disability (28)	No association Adj (exact values not shown)	1	179	Not serious	N/A	Serious	N/A	None	**Very low**
Postpartum									
Postpartum PLPP intensity (27)	No association Adj β 0.053, p 0.791	1	27	Not serious	N/A	None	Serious	None	**Very low**
Postpartum disability (27)	No associations Adj β 0.283, p 0.125 (PGQ) Adj β 0.196, p 0.281 (ODI)	1	27	Not serious	None	None	Serious	None	**Very low**
Postpartum PLPP frequency (27)	No association Adj β 0.003, p 0.990	1	27	Not serious	N/A	None	Serious	None	**Very low**
Neuroticism Prenatal									
Postpartum PLPP intensity (40)	Positive association Adj OR 2.03, CI 1.92-2.13, p 0.002	1	264	Not serious	N/A	None	Not serious	None	**Low**
Extraversion prenatal									
Postpartum PLPP intensity (40)	Negative association Adj OR 0.79, CI 0.71-0.87, p 0.004	1	264	Not serious	N/A	None	Not serious	None	**Low**
Conscientiousness prenatal									
Postpartum PLPP intensity (40)	Negative association Adj OR 0.92, CI 0.87-0.97, p 0.021	1	264	Not serious	N/A	None	Not serious	None	**Low**
Openness to experience prenatal									
Postpartum PLPP intensity (40)	No association	1	264	Not serious	N/A	None	Not serious	None	**Low**

	Adj OR 1.23, CI 1.12-1.34, p 0.928								
Agreeableness prenatal									
Postpartum PLPP intensity (40)	No association Adj OR 0.88, CI 0.83-0.93, p 0.626	1	264	Not serious	N/A	None	Not serious	None	**Low**
Previous psychological difficulties Prenatal									
Prenatal presence of PLPP (26)	Inconsistent associations	1	1,328	Not serious	Not serious	Not serious	Serious	None	**Very low**
Yes, but I did not seek treatment	No association Adj OR 1.29, CI 0.94-1.76, p 0.1090 (T2) Relative important factor analysis (T3) Inconsistent associations Positive association Adj OR 1.71, CI 1.31-2.24, p 0.0001 (T2)	1	1,328	Not serious	None	Not serious	Serious	None	**Very low**
Yes and I did seek treatment	No association Relative important factor analysis (T3)	1	1,328	Not serious	Not serious	Not serious	Serious	None	**Very low**

Abbreviations: β: beta coefficient, OR: odds ratio, adj: adjusted, CI: confidence interval, PMI: Pregnancy Mobility Index, OCI: Overall Complaints Index, PLPP: pregnancy-related lumbopelvic pain, DRI: Disability Rating Index, HR: hazard ratio, PGQ: Pelvic Girdle Questionnaire, ODI: Oswestry Disability Index, T2: second trimester, T3: third trimester

Additional file 1. Search strategy for specific databases

	Web of Science	**Scopus**	**Cochrane Library**	**Embase**
Pregnancy	TOPIC: pregnant OR pregnancy OR preconception OR "pre-pregnancy" OR prenatal OR prepartum OR postnatal OR postpartum OR peripartum	Article title, Abstract, Keywords: pregnant OR pregnancy OR preconception OR "pre-pregnancy" OR prenatal OR prepartum OR postnatal OR postpartum OR peripartum	Pregnant OR pregnancy OR preconception OR "pre-pregnancy" OR prenatal OR prepartum OR postnatal OR postpartum OR peripartum (title/abstract/keywords) OR Pregnancy OR Postpartum Period (Mesh)	('pregnancy'/de OR 'child bearing' OR 'childbearing' OR 'gestation' OR 'gravidity' OR 'intrauterine pregnancy' OR 'labor presentation' OR 'labour presentation' OR 'pregnancy' OR 'pregnancy maintenance' OR 'pregnancy trimesters') OR 'pregnancy':ti,ab OR ('pregnant woman'/de OR 'pregnant woman' OR 'pregnant women') OR 'pregnant':ti,ab OR 'preconception'/de OR

				'preconception':ti,ab OR 'prenatal'/de OR 'Prenatal':ti,ab OR 'postnatal':ti,ab OR 'perinatal period'/de OR 'perinatal':ti,ab OR 'Pre-pregnancy':ti,ab OR 'Prepartum':ti,ab OR 'Postpartum':ti,ab
Lumbopelvic pain	TOPIC: “lumbopelvic pain” OR “pelvic girdle pain” OR “pelvic pain” OR “low back pain” OR “lumbar pain” OR “back pain” OR backache* OR “spinal pain” OR “symphysis pubis pain” OR “pubic symphysis pain” OR “sacroiliac joint pain” OR “LBP” OR “PLPP” OR “PPGP” OR “PLBP” OR “PGP”	Article title, Abstract, Keywords: “lumbopelvic pain” OR “pelvic girdle pain” OR “pelvic pain” OR “low back pain” OR “lumbar pain” OR “back pain” OR backache* OR “spinal pain” OR “symphysis pubis pain” OR “pubic symphysis pain” OR “sacroiliac joint pain” OR “LBP” OR “PLPP” OR “PPGP” OR “PLBP” OR “PGP”	“lumbopelvic pain” OR “pelvic girdle pain” OR “pelvic pain” OR “low back pain” OR “lumbar pain” OR “back pain” OR backache OR “spinal pain” OR “symphysis pubis pain” OR “pubic symphysis pain” OR “sacroiliac joint pain” OR “LBP” or “PLPP” OR “PPGP” OR “PLBP” OR “PGP” (title/abstract/keywords) OR Pelvic Girdle Pain OR Pelvic Pain OR Low Back Pain OR Back Pain	'lumbopelvic pain'/de OR 'lumbopelvic pain':ti,ab OR ('pelvic girdle pain'/de OR 'pelvic girdle pain') OR 'Pelvic girdle pain':ti,ab OR ('low back pain'/de OR 'acute low back pain' OR 'back pain, low' OR 'chronic low back pain' OR 'loin pain' OR 'low back pain' OR 'low backache' OR 'low backpain' OR 'lowback pain' OR 'lower back pain' OR 'lumbago' OR 'lumbal pain' OR 'lumbal syndrome' OR 'lumbalgesia' OR 'lumbalgia' OR 'lumbar pain' OR 'lumbar spine syndrome' OR 'lumbodynia' OR 'lumbosacral pain' OR 'lumbosacral root syndrome' OR 'lumbosacroiliac strain' OR 'pain, low back' OR 'pain, lumbosacral' OR 'strain, lumbosacroiliac') OR 'Low back pain':ti,ab OR ('symphysis pain'/de OR 'symphyseal pain' OR 'symphysial pain' OR 'symphysic pain' OR 'symphysis pain' OR 'symphysis pubic pain' OR 'symphysis pubis pain') OR 'Symphysis pubis pain':ti,ab OR 'sacroiliac joint pain'/de OR 'Sacroiliac joint pain':ti,ab OR 'backache'/de OR 'Backache*':ti,ab OR 'spinal pain'/de OR 'Spinal pain':ti,ab OR 'pelvic pain'/de OR 'Pelvic pain':ti,ab OR 'Lumbar pain':ti,ab OR 'Back pain':ti,ab OR 'LBP':ti,ab OR 'PLPP':ti,ab OR 'PLBP':ti,ab OR 'PPGP':ti,ab OR 'PGP':ti,ab
Psychological factors	TOPIC: psychological OR psychosocial OR fear* OR “fear of pain” OR “fear of movement” OR “fear-avoidance” OR avoidan* OR catastroph* OR anxiety OR kinesiophob* OR coping OR “self-efficacy” OR harmful* OR depress* OR stress OR distress OR optimism OR pessimism OR emotion* OR	Article title, Abstract, Keywords: psychological OR psychosocial OR fear* OR “fear of pain” OR “fear of movement” OR “fear avoidance” OR avoidan* OR catastroph* OR anxiety OR kinesiophob* OR coping OR “self efficacy” OR harmful* OR depress* OR stress OR distress OR optimism OR pessimism OR	psychological OR psychosocial OR fear OR “fear of movement” OR “fear of pain” OR “fear-avoidance” OR avoidance OR catastrophizing OR anxiety OR kinesiophobia OR coping OR “self-efficacy” OR harmfulness OR depression OR stress OR distress OR optimism OR pessimism OR emotion OR hypervigilance OR belief OR perception OR expectation OR cognition OR attention OR “positive affect” OR “negative affect” (title/abstract/keywords) OR Psychology OR Fear OR Anxiety OR Kinesiophobia OR	'psychological factors'/de OR 'psychological':ti,ab OR 'psychosocial'/de OR 'Psychosocial':ti,ab OR 'fear'/de OR 'fear*':ti,ab OR 'fear avoidance'/de OR 'fear-avoidance':ti,ab OR 'fear of movement'/de OR 'Fear of movement':ti,ab OR 'fear of pain'/de OR 'Fear of pain':ti,ab OR 'avoidance behavior'/de OR 'Avoidan*':ti,ab OR 'catastrophizing'/de OR 'Catastroph*':ti,ab OR 'anxiety'/de OR 'Anxiety':ti,ab OR 'kinesiophobia'/de OR

	hypervigilan* OR belief* OR perception* OR expectation* OR cognition* OR attention* OR “positive affect” OR “negative affect”	emotion* OR hypervigilan* OR belief* OR perception* OR expectation* OR cognition* OR attention* OR “positive affect” OR “negative affect”	Catastrophization OR “coping skills” OR “avoidance learning” OR “Self Efficacy” OR Depression OR “Stress, psychological” OR “psychological distress” OR Optimism OR Pessimism OR Emotions OR Perception OR Cognition OR Attention (Mesh)	'Kinesiophob*':ti,ab OR 'coping'/de OR 'Coping':ti,ab OR 'Self-efficacy':ti,ab OR 'harmful*':ti,ab OR 'depression'/de OR 'Depress*':ti,ab OR 'physiological stress'/de OR 'Stress':ti,ab OR 'distress':ti,ab OR 'optimism'/de OR 'Optimism':ti,ab OR 'pessimism'/de OR 'Pessimism':ti,ab OR 'emotion'/de OR 'Emotion*':ti,ab OR 'hypervigilance'/de OR 'Hypervigilan*':ti,ab OR 'belief'/de OR 'belief*':ti,ab OR 'perception'/de OR 'Perception*':ti,ab OR 'deectation'/de OR 'deectation*':ti,ab OR 'cognition'/de OR 'cognition*':ti,ab OR 'attention'/de OR 'Attention*' OR 'positive affect'/de OR 'Positive affect':ti,ab OR 'negative affect'/de OR 'Negative affect':ti,ab
Risk factors	“risk factors” OR “predictive factors” OR predictors OR “prognostic factors” OR “associated factors” OR “influencing factors”	“risk Factors” OR “predictive factors” OR predictors OR “prognostic factors” OR “associated factors” OR “influencing factors”	“risk factors” OR “predictive factors” OR predictors OR “prognostic factors” OR “associated factors” OR “influencing factors” (title/abstract/keywords) OR Risk Factors (Mesh)	'risk factor'/de OR 'Risk factors':ti,ab OR 'Predictive factors':ti,ab OR 'predictors'/de OR 'predictors':ti,ab OR 'prognostic factors'/de OR 'Prognostic factors':ti,ab OR 'Associated factors':ti,ab OR 'Influencing factors':ti,ab

Additional file 2. Predefined scoring criteria of the QUIPS.

Domain	Rating of reporting	Risk assessment
1. Study Participation		
The source population or population of interest is adequately described for key characteristics.	**Yes:** >2 characteristics	**Low bias:** no items poorly reported
	Partial: 1-2 characteristic	**Moderate bias:** 1 or 2 items poorly reported, and baseline characteristics had to be adequately reported
	No: 0 characteristics	**High bias**: >2 items poorly reported, or poor reporting of baseline characteristics
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	**Yes:** enough information to replicate	
	Partial: limited information	Adequate reporting of source population characteristics: age, stage of pregnancy, with PLPP or without PLPP
	No: no information	
Period of recruitment is adequately described.	**Yes/no**	Adequate reporting of baseline population characteristics: age, BMI, educational level, physical activity levels, physical job demands, history of lumbopelvic pain, history of trauma, parity, PLPP intensity, disability
Place of recruitment is adequately described.	**Yes/no**	
Inclusion and exclusion criteria are adequately described.	**Yes/no**	
There is adequate participation in the study by eligible individuals.	**Yes/no**	
The baseline study sample is adequately described for key characteristics.	**Yes:** 6-9 characteristics	
	Partial: ≥ 1-5 characteristic	
	No: 0 characteristics	
2. Study Attrition		
Response rate is adequate.	**Yes:** ≤15%	**Low bias:** data of ≥85% of participants available for analysis
	Partial: 15% - 30%	**Moderate bias**: <85% of participants available for analysis and 1 or 2 items poorly reported
	No: >30%	**High bias:** <85% of participants available for analysis and > 2 items poorly reported
Attempts to collect information on participants who dropped out of the study are described.	**Yes/no**	
Reasons for loss to follow-up are provided.	**Yes/no**	Adequate reporting of key characteristics: age, BMI, educational level, physical activity levels, physical job demands, history of lumbopelvic pain, history of trauma, parity, PLPP intensity, disability
Participants lost to follow-up are adequately described for key characteristics.	**Yes:** ≥3 characteristics	

	Partial: 1-2 characteristics **No:** 0 characteristics	
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	**Yes:** mentioned **No:** not mentioned	
3. Prognostic Factor Measurement		
A clear definition or description of 'PF' is provided.	**Yes/no**	**Low bia**s: no items poorly reported
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	**Yes:** all methods are validated **Partial:** combination of validated and not validated methods **No:** no validated methods	**Moderate bias**: 1 or 2 items poorly reported, but adequate definition of the psychological factor **High bias**: >2 items poorly reported, or poor definition of the psychological factor For adequate definition of the psychological factor, a reference to an available questionnaire should be provided, or the measurement should be adequately described in the report itself.
Continuous variables are reported or appropriate cut-points are used.	**Yes/no**	
The method and setting of measurement of PF is the same for all study participants.	**Yes/no**	
Adequate proportion of the study sample has complete data for PF variable.	**Yes/no**	
Appropriate methods of imputation are used for missing 'PF' data.	**Yes/no**	
4. Outcome Measurement		
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	**Yes/no**	**Low bias:** no items poorly reported **Moderate bias:** 1 item poorly reported, but adequate definition of the outcome measurement **High bias**: >1 item poorly reported, or poor definition of the outcome measurement For adequate definition of the outcome measurement, a reference to the outcome measurement should be provided, or the outcome measurement should be adequately described in the report itself.
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	**Yes:** all methods are validated **Partial:** combination of validated and not validated methods **No:** no validated methods	
The method and setting of outcome measurement is the same for all study participants.	**Yes/no**	
5. Study Confounding		
All important confounders, including treatments, are measured.	**Yes:** 6-8 important confounders	**Low bias:** no items poorly reported

	Partial: ≥ 1-5 important confounders **No:** no important confounders	**Moderate bias:** 1 or 2 items poorly reported, or moderate accounting for confounding factors **High bias:** >2 items poorly reported or poor accounting for confounding factors Accounting for important confounding factors: BMI, educational level, physical activity levels, physical job demands, history of lumbopelvic pain, history of trauma, parity, PLPP intensity, disability
Clear definitions of the important confounders measured are provided.	**Yes/no**	
Measurement of all important confounders is adequately valid and reliable.	**Yes/no**	
The method and setting of confounding measurement are the same for all study participants.	**Yes/no**	
Appropriate methods are used if imputation is used for missing confounder data.	**Yes/no**	
Important potential confounders are accounted for in the study design.	**Yes/no**	
Important potential confounders are accounted for in the analysis.	**Yes:** 6-8 important confounders **Partial**: ≥ 1-5 important confounders **No:** no important confounders	
6. Statistical Analysis and Reporting		
There is sufficient presentation of data to assess the adequacy of the analysis.	**Yes/no**	**Low bias:** no items poorly reported **Moderate bias:** 1 or 2 items poorly reported **High bias:** >2 items poorly reported
The strategy for model building is appropriate and is based on a conceptual framework or model.	**Yes/no**	
The selected statistical model is adequate for the design of the study.	**Yes/no**	
There is no selective reporting of results.	**Yes/no**	
Overall rating of the study		**Low risk of bias:** At least 4/6 domains with low risk, including the domains 'study confounding' and 'statistical analysis and reporting' **Moderate risk of bias:** 4/6 domains with low risk, not including the domains 'study confounding' and 'statistical analysis and reporting' or 2-3/6 domains with low risk **High risk of bias:** maximum 1/6 domains with low risk

Additional file 2. QUIPS risk of bias assessment for each included study.

Algard et al., 2023 (38)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Yes
Period of recruitment is adequately described.	Yes
Place of recruitment is adequately described.	Yes
Inclusion and exclusion criteria are adequately described.	Yes
There is adequate participation in the study by eligible individuals.	No
The baseline study sample is adequately described for key characteristics.	Yes
	Moderate
2. Study Attrition	
Response rate is adequate.	Yes
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	Yes
Participants lost to follow-up are adequately described for key characteristics.	Yes
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	Yes
	Low
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	Yes

The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	Yes
Appropriate methods of imputation are used for missing 'PF' data.	Yes
	Low
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	Yes
The method and setting of outcome measurement is the same for all study participants.	Yes
	Low
5. Study Confounding	
All important confounders, including treatments, are measured.	Partial
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Partial
	High
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	Yes
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	Yes
	Low
Overall rating of the study	**Moderate**

Bakker et al., 2013 (32)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Yes
Period of recruitment is adequately described.	No
Place of recruitment is adequately described.	Yes
Inclusion and exclusion criteria are adequately described.	No
There is adequate participation in the study by eligible individuals.	Yes
The baseline study sample is adequately described for key characteristics.	Partial
	High
2. Study Attrition	
Response rate is adequate.	No
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	Yes
Participants lost to follow-up are adequately described for key characteristics.	Yes
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	Yes
	High
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	Yes
The method and setting of measurement of PF is the same for all study participants.	No
Adequate proportion of the study sample has complete data for PF variable.	No

Appropriate methods of imputation are used for missing 'PF' data.	No
	High
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	Yes
The method and setting of outcome measurement is the same for all study participants.	Yes
	Low
5. Study Confounding	
All important confounders, including treatments, are measured.	Partial
Clear definitions of the important confounders measured are provided.	No
Measurement of all important confounders is adequately valid and reliable.	No
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Partial
	High
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	Yes
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	No
	Moderate
Overall rating of the study	**High**

Bjelland et al., 2010 (37)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Yes
Period of recruitment is adequately described.	Yes
Place of recruitment is adequately described.	Yes
Inclusion and exclusion criteria are adequately described.	Yes
There is adequate participation in the study by eligible individuals.	Yes
The baseline study sample is adequately described for key characteristics.	No
	High
2. Study Attrition	
Response rate is adequate.	Yes
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	No
Participants lost to follow-up are adequately described for key characteristics.	No
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	No
	Low
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	Yes
The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	No

Appropriate methods of imputation are used for missing 'PF' data.	No
	Moderate
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	Partial
The method and setting of outcome measurement is the same for all study participants.	Yes
	Low
5. Study Confounding	
All important confounders, including treatments, are measured.	Yes
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Yes
	Moderate
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	No
The strategy for model building is appropriate and is based on a conceptual framework or model.	No
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	Yes
	High
Overall rating of the study	**Moderate**

Bjelland et al., 2013 (36)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Yes
Period of recruitment is adequately described.	Yes
Place of recruitment is adequately described.	Yes
Inclusion and exclusion criteria are adequately described.	Yes
There is adequate participation in the study by eligible individuals.	No
The baseline study sample is adequately described for key characteristics.	No
	High
2. Study Attrition	
Response rate is adequate.	No
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	Yes
Participants lost to follow-up are adequately described for key characteristics.	No
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	Yes
	High
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	Yes
The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	Yes

Appropriate methods of imputation are used for missing 'PF' data.	Yes
	Low
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	Partial
The method and setting of outcome measurement is the same for all study participants.	Yes
	Low
5. Study Confounding	
All important confounders, including treatments, are measured.	Partial
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Partial
	High
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	No
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	Yes
	Moderate
Overall rating of the study	**Moderate**

Chang et al., 2014 (39)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Partial
Period of recruitment is adequately described.	Yes
Place of recruitment is adequately described.	Yes
Inclusion and exclusion criteria are adequately described.	Yes
There is adequate participation in the study by eligible individuals.	Yes
The baseline study sample is adequately described for key characteristics.	Yes
	Low
2. Study Attrition	
Response rate is adequate.	Partial
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	Yes
Participants lost to follow-up are adequately described for key characteristics.	Yes
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	No
	Moderate
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	No
The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	No

Appropriate methods of imputation are used for missing 'PF' data.	No
	High
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	Yes
The method and setting of outcome measurement is the same for all study participants.	Yes
	Low
5. Study Confounding	
All important confounders, including treatments, are measured.	Yes
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Yes
	Moderate
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	Yes
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	Yes
	Low
Overall rating of the study	**Moderate**

Ertmann et al., 2023 (26)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Yes
Period of recruitment is adequately described.	Yes
Place of recruitment is adequately described.	Yes
Inclusion and exclusion criteria are adequately described.	Yes
There is adequate participation in the study by eligible individuals.	No
The baseline study sample is adequately described for key characteristics.	No
	High
2. Study Attrition	
Response rate is adequate.	Yes
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	Yes
Participants lost to follow-up are adequately described for key characteristics.	No
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	No
	Low
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Partial
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Partial
Continuous variables are reported or appropriate cut-points are used.	No
The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	Yes

Appropriate methods of imputation are used for missing 'PF' data.	Yes
	Moderate
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	No
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	No
The method and setting of outcome measurement is the same for all study participants.	Yes
	High
5. Study Confounding	
All important confounders, including treatments, are measured.	Partial
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	Yes
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Partial
	Moderate
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	Yes
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	Yes
	Low
Overall rating of the study	**Moderate**

Fernando et al., 2020 (41)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Yes
Period of recruitment is adequately described.	Yes
Place of recruitment is adequately described.	Yes
Inclusion and exclusion criteria are adequately described.	No
There is adequate participation in the study by eligible individuals.	No
The baseline study sample is adequately described for key characteristics.	No
	High
2. Study Attrition	
Response rate is adequate.	No
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	Yes
Participants lost to follow-up are adequately described for key characteristics.	No
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	Yes
	High
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	Yes
The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	No

Appropriate methods of imputation are used for missing 'PF' data.	No
	Moderate
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	No
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	No
The method and setting of outcome measurement is the same for all study participants.	Yes
	High
5. Study Confounding	
All important confounders, including treatments, are measured.	Partial
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Partial
	High
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	Yes
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	Yes
	Low
Overall rating of the study	**High**

Girard et al., 2020 (27)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Yes
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Partial
Period of recruitment is adequately described.	Yes
Place of recruitment is adequately described.	No
Inclusion and exclusion criteria are adequately described.	Yes
There is adequate participation in the study by eligible individuals.	No
The baseline study sample is adequately described for key characteristics.	Yes
	Moderate
2. Study Attrition	
Response rate is adequate.	Yes
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	Yes
Participants lost to follow-up are adequately described for key characteristics.	Yes
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	Yes
	Low
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	Yes
The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	Yes

Appropriate methods of imputation are used for missing 'PF' data.	Yes
	Low
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	Partial
The method and setting of outcome measurement is the same for all study participants.	Yes
	Low
5. Study Confounding	
All important confounders, including treatments, are measured.	Partial
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	Partial
Important potential confounders are accounted for in the analysis.	No
	High
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	No
The strategy for model building is appropriate and is based on a conceptual framework or model.	No
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	No
	High
Overall rating of the study	**Moderate**

Olsson et al., 2012 (29)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Yes
Period of recruitment is adequately described.	No
Place of recruitment is adequately described.	Yes
Inclusion and exclusion criteria are adequately described.	No
There is adequate participation in the study by eligible individuals.	No
The baseline study sample is adequately described for key characteristics.	No
	High
2. Study Attrition	
Response rate is adequate.	No
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	Yes
Participants lost to follow-up are adequately described for key characteristics.	No
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	No
	High
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	No
The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	No

Appropriate methods of imputation are used for missing 'PF' data.	No
	High
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	No
The method and setting of outcome measurement is the same for all study participants.	Yes
	Moderate
5. Study Confounding	
All important confounders, including treatments, are measured.	Partial
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Partial
	High
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	Yes
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	Yes
	Low
Overall rating of the study	**High**

Robinson et al., 2010 (31)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Yes
Period of recruitment is adequately described.	**Yes**
Place of recruitment is adequately described.	**Yes**
Inclusion and exclusion criteria are adequately described.	**Yes**
There is adequate participation in the study by eligible individuals.	**Yes**
The baseline study sample is adequately described for key characteristics.	No
	High
2. Study Attrition	
Response rate is adequate.	
Attempts to collect information on participants who dropped out of the study are described.	Yes
Reasons for loss to follow-up are provided.	No
Participants lost to follow-up are adequately described for key characteristics.	Yes
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	No
	No
	Low
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	Yes

The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	No
Appropriate methods of imputation are used for missing 'PF' data.	No
	Moderate
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	Partial
The method and setting of outcome measurement is the same for all study participants.	Yes
	Low
5. Study Confounding	
All important confounders, including treatments, are measured.	Yes
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Yes
	Moderate
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	Yes
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	No
	Moderate
Overall rating of the study	**Moderate**

Robinson et al., 2010b (28)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Yes
Period of recruitment is adequately described.	No
Place of recruitment is adequately described.	Yes
Inclusion and exclusion criteria are adequately described.	No
There is adequate participation in the study by eligible individuals.	Yes
The baseline study sample is adequately described for key characteristics.	No
	High
2. Study Attrition	
Response rate is adequate.	Partial
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	Yes
Participants lost to follow-up are adequately described for key characteristics.	No
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	No
	High
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	Yes
The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	No

Appropriate methods of imputation are used for missing 'PF' data.	No
	Moderate
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	Partial
The method and setting of outcome measurement is the same for all study participants.	Yes
	Low
5. Study Confounding	
All important confounders, including treatments, are measured.	Partial
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Partial
	High
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	Yes
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	No
	Moderate
Overall rating of the study	**High**

Stomp-van den Berg et al., 2012 (30)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Yes
Period of recruitment is adequately described.	Yes
Place of recruitment is adequately described.	Yes
Inclusion and exclusion criteria are adequately described.	Yes
There is adequate participation in the study by eligible individuals.	Yes
The baseline study sample is adequately described for key characteristics.	No
	High
2. Study Attrition	
Response rate is adequate.	Yes
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	Yes
Participants lost to follow-up are adequately described for key characteristics.	No
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	No
	Low
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	Yes
The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	Yes

Appropriate methods of imputation are used for missing 'PF' data.	Yes
	Low
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	Partial
The method and setting of outcome measurement is the same for all study participants.	Yes
	Low
5. Study Confounding	
All important confounders, including treatments, are measured.	Yes
Clear definitions of the important confounders measured are provided.	No
Measurement of all important confounders is adequately valid and reliable.	No
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	No
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Yes
	High
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	Yes
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	No
	Moderate
Overall rating of the study	**Moderate**

Xiangsheng et al., 2021 (40)	
Domain	**Rating of reporting**
1. Study Participation	
The source population or population of interest is adequately described for key characteristics.	Partial
The sampling frame and recruitment are adequately described, including methods to identify the sample sufficient to limit potential bias.	Partial
Period of recruitment is adequately described.	No
Place of recruitment is adequately described.	No
Inclusion and exclusion criteria are adequately described.	Yes
There is adequate participation in the study by eligible individuals.	No
The baseline study sample is adequately described for key characteristics.	No
	High
2. Study Attrition	
Response rate is adequate.	Yes
Attempts to collect information on participants who dropped out of the study are described.	No
Reasons for loss to follow-up are provided.	No
Participants lost to follow-up are adequately described for key characteristics.	No
There are no important differences between key characteristics and outcomes in participants who completed the study and those who did not.	No
	Low
3. Prognostic Factor Measurement	
A clear definition or description of 'PF' is provided.	Yes
Method of PF measurement is adequately valid and reliable to limit misclassification bias.	Yes
Continuous variables are reported or appropriate cut-points are used.	No
The method and setting of measurement of PF is the same for all study participants.	Yes
Adequate proportion of the study sample has complete data for PF variable.	Yes

Appropriate methods of imputation are used for missing 'PF' data.	Yes
	Moderate
4. Outcome Measurement	
A clear definition of outcome is provided, including duration of follow-up and level and extent of the outcome construct.	Yes
The method of outcome measurement used is adequately valid and reliable to limit misclassification bias.	Partial
The method and setting of outcome measurement is the same for all study participants.	Yes
	Low
5. Study Confounding	
All important confounders, including treatments, are measured.	Partial
Clear definitions of the important confounders measured are provided.	Yes
Measurement of all important confounders is adequately valid and reliable.	Yes
The method and setting of confounding measurement are the same for all study participants.	Yes
Appropriate methods are used if imputation is used for missing confounder data.	Yes
Important potential confounders are accounted for in the study design.	No
Important potential confounders are accounted for in the analysis.	Partial
	Moderate
6. Statistical Analysis and Reporting	
There is sufficient presentation of data to assess the adequacy of the analysis.	Yes
The strategy for model building is appropriate and is based on a conceptual framework or model.	Yes
The selected statistical model is adequate for the design of the study.	Yes
There is no selective reporting of results.	Yes
	Low
Overall rating of the study	**Moderate**

Additional file 3. Complete data extraction.

AUTHORS (YEAR)		Algard et al., 2023 (38)
REFERENCE		Sweden
COUNTRY		
DESIGN		Prospective inception cohort study
MEASUREMENT POINTS		Prenatal: 2
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 356 Analysed: n = 214 (women with PLPP in early pregnancy were excluded)
	AGE	Mean age: No PLPP (n = 245): 31.5 yrs (SD 4.4) PLPP (n = 108): 31 yrs (SD 4.7)
	BMI	/
	PARITY/GRAVIDITY	Nullipara: No PLPP (n = 245): 57% PLPP (n = 108): 43%
	EDUCATIONAL LEVELS	University/college: No PLPP (n = 244): 74% PLPP (n = 108): 59%
	PHYSICAL ACTIVITY LEVELS	Physical activity level (0-10) during the 3 months before present pregnancy on two items (at leisure and at work) No PLPP (n = 245): median 4 (IQR 2) PLPP (n = 108): median 4 (IQR 3)
	PHYSICAL JOB DEMANDS	/
	HISTORY OF LUMBOPELVIC PAIN	Back/ pelvic pain before pregnancy: No PLPP (n = 248): 34% PLPP (n = 108): 40% Back/pelvic pain in previous pregnancy No PLPP (n = 134): 62% PLPP (n = 77): 74%
	HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
	LEVELS OF PAIN/DISABILITY DURING PREGNANCY	P4 test score (0-8): No PLPP (n = 247): median 0 PLPP (n = 108): median 3 (IQR 3)

PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Depression HADS-D Scale value: 0-21 T1 (mean week 11.6, SD 2.3)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	PLPP provocation The P4 test, one side at a time → sum score Scale values: 0-8 T3 (mean week 35.8, SD 1.0)
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • History of back/pelvic girdle pain (in previous pregnancy) • Educational level • High BMI • Parity • Physical activity level Other covariates: • Adverse childhood experiences • Age • Comorbidity • Intimate partner violence • Job • Marital status • Origin • Socio-economic status • Generalised joint hypermobility • Tobacco use • Work satisfaction
RESULTS REGARDING ASSOCIATION	Higher levels of depression at week 11.6: Associated with increased PLPP provocation in week 35.8 Adj β 0.32, CI 0.16-0.48, p <0.001 Adj β 0.41, CI 0.22-0.60, p <0.001 (History of back or pelvic pain before pregnancy replaced by history of back or pelvic girdle pain in previous pregnancy) Adj for history of back/pelvic girdle pain, high BMI, parity, physical activity level, adverse childhood experiences, age, generalised joint hypermobility, tobacco use, work satisfaction
AUTHORS (YEAR) **REFERENCE** **COUNTRY**	Bakker et al., 2013 (32) The Netherlands
DESIGN **MEASUREMENT POINTS**	Prospective cohort study Prenatal: 3

CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 223
	AGE	Mean age: 30.5 yrs (SD 4.1)
	BMI	Mean pre-pregnancy BMI: 24.2 kg/m² (SD 4.2)
	PARITY/GRAVIDITY	Parity: Primipara: 52% Multipara: 48%
	EDUCATIONAL LEVELS	Low: 12% Middle: 75% High: 14%
	PHYSICAL ACTIVITY LEVELS	/
	PHYSICAL JOB DEMANDS	/
	HISTORY OF LUMBOPELVIC PAIN	Back pain before pregnancy: Never: 35% Sometimes: 50% Frequently: 12% Always: 3% Lumbopelvic pain in previous pregnancy: 5%
	HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
	LEVELS OF PAIN/DISABILITY DURING PREGNANCY	/
PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**		Perceived stress PSS Scale values: 0-56 Anxiety PRAQ Scale values: 10-70 Emotional distress SCL-90-R Scale values: 90-450 Coping UCL Scale values: Problem-focused coping

	Emotional-focused coping T1 (week 12), T2 (week 24)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Disability OCI Scale values: 0-15 PMI Scale values: 0-81 T3 (week 36)
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • Parity • Education • BMI • Back pain before pregnancy Other covariates: • Age at delivery
RESULTS REGARDING ASSOCIATION	Higher levels of stress at week 12 or week 24: Associated with greater disability at week 36 PMI week 12: adj β 0.233, p 0.0004 PMI week 24: adj β 0.347, p 0.003 OCI week 12: adj β 0.134, p 0.092 OCI week 24: adj β 0.319, p 0.004 Adj for parity, education, BMI, back pain before pregnancy, age at delivery Higher levels of stress at week 24: Associated with greater disability at week 36: PMI adj extra model β 0.220, p 0.006 OCI adj extra model β 0.224, p <0.05 Adj for PMI at T2 Higher levels of anxiety at week 12 or week 24: Not associated with disability at week 36 PMI week 12: adj β 0.076, p 0.331 PMI week 24: adj β 0.070, p 0.550 OCI week 12: adj β 0.017, p 0.828 OCI week 24: adj β 0.168, p 0.133 Adj for parity, education, BMI, back pain before pregnancy, age at delivery Higher levels of emotional distress at week 12 or week 24: Associated with greater disability at week 36 PMI week 12: adj β 0.263, p 0.001 PMI week 24: adj β 0.334, p 0.004

		OCI week 12: adj β 0.217, p 0.005 OCI week 24: adj β 0.302, p 0.007 Adj for parity, education, BMI, back pain before pregnancy, age at delivery Higher levels of coping at week 12 or week 24: Problem-focused coping: Not associated with disability at week 36 PMI week 12: adj β 0.012, p 0.878 PMI week 24: adj β 0.074, 0.520 OCI week 12: adj β 0.012, p 0.882 OCI week 24: adj β 0.041, p 0.716 Adj for parity, education, BMI, back pain before pregnancy, age at delivery Emotion-focused coping: Not associated with disability at week 36 PMI week 12: adj β -0.044, p 0.583 PMI week 24: adj β 0.113, p 0.335 OCI week 12: adj β -0.030, p 0.702 OCI week 24: adj β 0.083, p 0.460 Adj for parity, education, BMI, back pain before pregnancy, age at delivery
AUTHORS (YEAR) **REFERENCE** **COUNTRY**		Bjelland et al., 2010 (37) Norway
DESIGN **MEASUREMENT POINTS**		Prospective cohort study Prenatal: 2
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Analysed: n = 75,939
	AGE	Mean age: 29.7 yrs (SD 4.6)
	BMI	Mean BMI in week 17: 25.1 kg/m² (SD 4.2)
	PARITY/GRAVIDITY	Parity: 0: 46.2% 1: 35.7% 2: 14.7 % ≥ 3: 3.4%
	EDUCATIONAL LEVELS	Years: <12: 7.7% 12: 27.4% 13-16: 39.3% ≥ 17: 20.5% Missing: 5.1%

PHYSICAL ACTIVITY LEVELS	Pre-pregnancy physical activity weekly: <1 time: PLPP (n = 11,414): 15.6% Severe PLPP (n = 1,906): 2.5% 1-2 times: PLPP (n = 11,414): 14.8% Severe PLPP (n = 1,906): 2.3% ≥ 3 times: PLPP (n = 11,414): 14.7% Severe PLPP (n = 1,906): 2.5% Missing: PLPP (n = 11,414): 15.8% Severe PLPP (n = 1,906): 4.0%
PHYSICAL JOB DEMANDS	Physical demanding work: No: PLPP (n = 11,414): 12.8% Severe PLPP (n = 1,906): 1.9% Yes: PLPP (n = 11,414): 19.2% Severe PLPP (n = 1,906): 3.6% Missing: PLPP (n = 11,414): 17.2% Severe PLPP (n = 1,906): 3.0%
HISTORY OF LUMBOPELVIC PAIN	Previous low back pain: 19.2%
HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
LEVELS OF PAIN/DISABILITY DURING PREGNANCY	Pain: 15% Severe pain: 2.5%
PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Emotional distress HSCL-5 Dichotomised using a cut-off of 2.0 T2 (week 17)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Presence of pain: 5. Question: Do you have pain in the pelvic girdle? 6. Where is the pain located? + PLPP intensity/location (mild/severe) Dichotomised: • PLPP - PLPP: pain in 3 pelvic locations - Severe PLPP: severe pain in all 3 pelvic locations • No PLPP

		T3 (week 30)
KEY COVARIATES **OTHER COVARIATES**		Key covariates: • Parity • BMI • Educational level • Previous low back pain • Physically demanding work • Pregnancy physical activity weekly Other covariates: • Maternal age • Smoking in pregnancy
RESULTS REGARDING ASSOCIATION		Emotional distress at week 17: Associated with increased odds of presence of PLPP at week 30 Adj OR 1.6, CI 1.5-1.8, p 0.01 Adj for parity, BMI, educational level, previous low back pain, physically demanding work, pregnancy physical activity weekly, maternal age, smoking in pregnancy Associated with increased odds of presence of severe PLPP at week 30 Adj OR 2.0, CI 1.8-2.3, p 0.001 Adj for parity, BMI, educational level, previous low back pain, physically demanding work, pregnancy physical activity weekly, maternal age, smoking in pregnancy
AUTHORS (YEAR) **REFERENCE** **COUNTRY**		Bjelland et al., 2013 (36) Norway
DESIGN **MEASUREMENT POINTS**		Prospective cohort study Prenatal: 2 Postpartum: 1
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 107,381 Analysed: n = 41,421 (women without PLPP during pregnancy were excluded)
	AGE	Mean age: 29.7 yrs (SD 4.5)
	BMI	Mean BMI in week 17: 25.4 kg/m² (SD 4.3)
	PARITY/GRAVIDITY	First-time mothers: 41%
	EDUCATIONAL LEVELS	/
	PHYSICAL ACTIVITY LEVELS	/

PHYSICAL JOB DEMANDS	/
HISTORY OF LUMBOPELVIC PAIN	Previous low back pain: Yes: PLPP (n = 1,448): 5.5% Severe PLPP (n = 196): 0.8% No: PLPP (n = 1,448): 2.9% Severe PLPP (n = 196): 0.4%
HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
LEVELS OF PAIN/DISABILITY DURING PREGNANCY	Level of severity in pregnancy Pain in 1 or 2 locations: PLPP (n=1,448): 1.5% Severe PLPP (n = 196): 0.2% Pain in 3 locations PLPP (n=1,448): 6.7% Severe PLPP (n = 196): 0.7% Severe pain in 3 locations PLPP (n=1,448): 23.1% Severe PLPP (n = 196): 5.0%
PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Emotional distress HSCL-5 3. Dichotomised using a cut-off of 2.0 4. Categorised: • No emotional distress • Emotional distress at 1 time point • Emotional distress at 2 time points T2 (mean week 17.2, SD 2.2), T3 (mean week 30.5, SD 1.4)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Presence of pain: 7. Question: Do you have pain in the pelvic girdle? 8. Where is the pain located? + PLPP intensity/location (mild/severe) Dichotomised: • PLPP - PLPP: pain in 3 pelvic locations - Severe PLPP: severe pain in all 3 pelvic locations • No PLPP 6 months pp (mean week 28.0, SD 3.0)
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • Number of deliveries • Educational level

- BMI at week 17
- History of low back pain

Other covariates:

- Co-morbidity index
- Age at menarche
- Maternal age upon inclusion
- Medical co-morbidity index
- Smoking during pregnancy
- Pain severity in pregnancy

RESULTS REGARDING ASSOCIATION

Emotional distress at week 17:
Associated with increased odds of presence of PLPP at 6 months pp
Adj OR 1.3, CI 1.1-1.5, p <0.01
Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy

Associated with increased odds of presence of severe PLPP at 6 months pp
Adj OR 2.0, CI 1.4-2.9, p <0.001
Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy

Associated with increased odds of presence of PLPP at 6 months pp
Adj OR 1.4, CI 1.1-1.7, p <0.01 (in women with onset of PLPP after week 17)
Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy

Associated with increased odds of presence of severe PLPP at 6m pp
Adj OR 2.3, CI 1.3-4.0, p <0.01 (in women with onset of PLPP after week 17)
Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy

Emotional distress at week 17 and week 30:
Associated with increased odds of presence of PLPP at 6 months pp
Adj OR 1.5, CI 1.2-1.9, p <0.001
Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy

Associated with increased odds of presence of severe PLPP at 6 months pp
Adj OR 1.9, CI 1.1-3.1, p <0.05
Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy

Associated with increased odds of presence of PLPP at 6 months pp
Adj OR 1.9, CI 1.4-2.6, p <0.001 (in women with onset of PLPP after week 17)

		Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy Associated with increased odds of presence of severe PLPP at 6 months pp Adj OR 2.3, CI 1.1-4.9, p <0.05 (in women with onset of PLPP after week 17) Adj for BMI, previous low back pain, co-morbidity index, age at menarche, smoking during pregnancy, pain severity in pregnancy
AUTHORS (YEAR) **REFERENCE** **COUNTRY**		Chang et al., 2014 (39) Taiwan
DESIGN **MEASUREMENT POINTS**		Longitudinal design Prenatal: 3
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 214 Analysed: n = 214
	AGE	Mean age: 33.3 yrs (SD 4.0)
	BMI	Mean BMI: Week 28: 24.5 kg/m² (SD 3.2) Week 32: 25.2 kg/m² (SD 3.3) Week 36: 25.7 kg/m² (SD 3.1)
	PARITY/GRAVIDITY	Parity: 0: 60.7% 1: 33.2% 2: 4.7% Missing: 1.4%
	EDUCATIONAL LEVELS	High school: 11.2% College: 66.4% Graduate: 22.0% Missing: 0.5%
	PHYSICAL ACTIVITY LEVELS	Regular exercise (yes) Week 28: 10.3% Week 32: 11.2% Week 36: 11.7%
	PHYSICAL JOB DEMANDS	Mean score on Physical Workload Questionnaire: Week 28: 2.4 (SD 1.3) Week 32: 2.4 (SD 1.4) Week 36: 2.3 (SD 1.3)
	HISTORY OF LUMBOPELVIC PAIN	Low back pain history: 36%

	No low back pain history: 61.7% Missing (forget): 2.3%
HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
LEVELS OF PAIN/DISABILITY DURING PREGNANCY	Mean pain intensity: 2.75/10 Mean pain interference: 2.36/10
PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Pain catastrophising PCS Scale values 0-50 Depression PHQ-9 Scale values 1-27 T3 (week 28, SD 2)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Changes in PLPP intensity BPI-PLPP intensity, average over the past week Scale values: NRS 0-10 average over 3 time points Changes in PLPP interference BPI-PLPP interference during the past week Scale values: NRS 0-10 → averaged → composite score average over 3 time points T3 (week 28, SD 2; week 32, SD 2; week 36, SD 2)
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • Low back pain history • Physical workload • Educational level • Parity • Regular exercise • BMI Other covariates: • Average pain intensity gestational age 24 weeks • Age • Social support • Pain intensity • Amino fluid index • Estimated foetus body weight • Depression • Pain catastrophising • Time

RESULTS REGARDING ASSOCIATION		Higher levels of pain catastrophising at week 28: Associated with greater changes in PLPP intensity at week 36 Adj β 0.10, CI 0.08-0.12, p <0.001 Adj for low back pain history, physical workload, average PLPP intensity gestational age 24 weeks, social support, depression, pain catastrophising, time Associated with greater changes in PLPP interference at week 36 Adj β 0.06, CI 0.04-0.08, p <0.001 Adj for low back pain history, physical workload, average PLPP intensity gestational age 24 weeks, social support, depression, time, pain catastrophising Higher levels of depression at week 28: not associated with changes in PLPP intensity at week 36 Adj β 0.02, CI -0.02-0.06, p 0.43 Adj for low back pain history, physical workload, average PLPP intensity gestational age 24 weeks, social support, depression, pain catastrophising, time Associated with greater changes in PLPP interference at week 36 Adj β 0.10, CI -0.07-0.14, p <0.001 Adj for low back pain history, physical workload, average PLPP intensity gestational age 24 weeks, social support, depression, time, pain catastrophising
AUTHORS (YEAR) **REFERENCE** **COUNTRY**		Ertmann et al., 2023 (26) Denmark
DESIGN **MEASUREMENT POINTS**		Prospective cohort study Prenatal: 3
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 1,491 Analysed: n = 1,328
	AGE	>30 years: 52.86%
	BMI	/
	PARITY/GRAVIDITY	No previous births: 44.35%
	EDUCATIONAL LEVELS	<4 years education: 50.30%
	PHYSICAL ACTIVITY LEVELS	/
	PHYSICAL JOB DEMANDS	/
	HISTORY OF LUMBOPELVIC PAIN	/
	HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/

LEVELS OF PAIN/DISABILITY DURING PREGNANCY	/
PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Depression MDI Dichotomised using a cut-off of 21 Anxiety ASS Dichotomised using a cut-off of 10 Previous psychological difficulties Categorised: • No • Yes, but I did not seek treatment • Yes and I did seek treatment T1 (week 6-10)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Presence of pain Question: PLPP? Yes/no + anatomic pictures Dichotomised • Self-reported PLPP • No self-reported PLPP T2 (week 25), T3 (week 32)
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • Education • Parity Other covariates: • Pelvic Girdle Pain • Vomiting • Age • Wellbeing • Nausea • Back pain • Pelvic cavity pain • Itching of vulva • Varicose veins • Leg cramps • Vaginal bleeding • Uterine contractions • Sleep complaints • Marital status • Occupation

	• Income of household • Smoking in pregnancy • Drinking alcohol in pregnancy • Use of other drugs • Previous miscarriages/abortions • In vitro fertilization • Self-rated health • Self-assessed fitness • Heart disease • Lung disease • Thyroid disease • Diabetes • Epilepsy • Recurrent urinary tract infections • Psychiatric disorders • Depression • Anxiety • Previous psychological difficulties
RESULTS REGARDING ASSOCIATION	Depression at week 6-10: Not associated with the presence of PLPP in T2 Relative important factor analysis Not associated with the presence of PLPP in T3 Relative important factor analysis Anxiety at week 6-10: Not associated with the presence of PLPP in T2 Relative important factor analysis Not associated with the presence of PLPP in T3 Relative important factor analysis Previous psychological difficulties: Yes, but I did not seek treatment Not associated with the presence of PLPP in T2 Adj OR 1.29, CI 0.94-1.76, p 0.1090 Adj for pelvic girdle pain, vomiting, age, well-being Yes and I did seek treatment Associated with increased odds of presence of PLPP in T2 Adj OR 1.71, CI 1.31-2.24, p 0.0001 Adj for pelvic girdle pain, vomiting, age, well-being Yes but I did not seek treatment

		Not associated with the presence of PLPP in T3 Relative important factor analysis Yes and I did seek treatment Not associated with the presence of PLPP in T3 Relative important factor analysis
AUTHORS (YEAR) **REFERENCE** **COUNTRY**		Fernando et al., 2020 (41) Sweden
DESIGN **MEASUREMENT POINTS**		Prospective cohort study Prenatal: 1 Postpartum: 1
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 470 Analysed: n = 260
	AGE	Mean age: 31.1 yrs (SD 4.7)
	BMI	/
	PARITY/GRAVIDITY	First pregnancy: Yes: n = 140/260 No: n = 115/260
	EDUCATIONAL LEVELS	/
	PHYSICAL ACTIVITY LEVELS	Exercise before pregnancy (min 45min/week) Yes: n = 186/260 No: n = 69/260 Exercise during weeks 34-37(min 45min/week) Yes: n = 109/260 No: n = 150/260
	PHYSICAL JOB DEMANDS	Working at present (students included, maternity leave and sick leave not included): Sedentary: n = 167/260 Non-sedentary: n = 68/260
	HISTORY OF LUMBOPELVIC PAIN	Lumbopelvic pain at week 19-21: Yes: n = 105/260 No: n = 68/260 Lumbopelvic pain at weeks 34-37: Yes: n = 161/260 No: n = 99/260

HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
LEVELS OF PAIN/DISABILITY DURING PREGNANCY	VAS-present (0-100) in week 34-37: PLPP (n = 161): median 22 (IQR 29.9) VAS-worst (0-100) in week 34-37: PLPP (n = 161): median 65.8 (IQR 33.0) DRI (0-100 in week 34-37: PLPP (n = 161): median 52.3 (IQR 30)
PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Pain catastrophising PCS Scale values: 0-52 Pain-related fear FABQ-activity Scale values: 0-24 T3 (week 34-37)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Presence of pain: Question: PLPP? Yes/no Dichotomised: • Self-reported PLPP • No self-reported PLPP 6 months pp
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • Lumbopelvic pain at weeks 19-21 • Lumbopelvic pain at weeks 34-37 • Sedentary occupation • First pregnancy • Exercise before pregnancy • Exercise at week 34-37 • DRI-total score Other covariates: • Daily or constant pain during pregnancy • Age • Onset of pain < week 11 • Pregnancy benefit • Sick leave • Pain catastrophising • Pain-related fear

RESULTS REGARDING ASSOCIATION		Higher levels of pain catastrophising at week 34-37: Not associated with the presence of PLPP at 6 months pp Adj OR 1.008, CI 0.975-1.042, p 0.648 Adj for Lumbopelvic pain at weeks 19-21, Lumbopelvic pain at weeks 34-37, daily or constant pain during pregnancy, DRI-total score Higher levels of pain-related fear at week 34-37: Associated with increased odds of the presence of PLPP at 6 months pp Adj OR 1.060, CI 1.005-1.118, p 0.033 Adj for Lumbopelvic pain at weeks 19-21, Lumbopelvic pain at weeks 34-37, daily or constant pain during pregnancy
AUTHORS (YEAR) **REFERENCE** **COUNTRY**		Girard et al., 2020 (27) Canada
DESIGN **MEASUREMENT POINTS**		Prospective observational cohort study Postpartum: 3
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 32 Analysed: n = 27
	AGE	Mean age: 28.3 yrs (SD 3.8)
	BMI	Mean BMI at 6.6 months pp: 26.9 kg/m² (SD 6.5)
	PARITY/GRAVIDITY	Parity: 1: 59.4% 2: 15.6% ≥ 3: 25% Gravidity: 1: 46.9% 2: 12.5% 3 or more: 40.7%
	EDUCATIONAL LEVELS	Degree obtained: None: 9.4% High school: 6.3% Professional: 9.4% Collegiate: 15.6% University: 59.4%
	PHYSICAL ACTIVITY LEVELS	Mean steps (per day): Baseline (T0): 7970 (SD 1977) 3-month assessment: 8318 (SD 2233) 6-month assessment: 8340 (SD 2416) Active min (per day):

	Lightly T0: 307 (SD 56) T3: 318 (SD 56) T6: 329 (SD 67) Fairly T0: 9 (SD 9) T3: 10 (SD 8) T6: 10 (SD 8) Very T0: 7 (SD 7) T3: 8 (SD 9) T6: 5 (SD 6) Fairly + very active (per week) T0: 107 (SD 88) T3: 113 (SD 107) T6: 104 (SD 87)
PHYSICAL JOB DEMANDS	/
HISTORY OF LUMBOPELVIC PAIN	The number of days with lumbopelvic pain over the last year: >30d: 100%
HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	Women were excluded if they had a history of vertebral surgery or lumbar disc herniation.
LEVELS OF PAIN/DISABILITY DURING PREGNANCY	/
PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Pain-related fear TSK Scale values: 17-68 Anxiety STAI Scale values: 20-80 Timepoint 1: 3 to 12 months pp (mean months 6.6, SD 2.0)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	PLPP intensity reduction Question: Highest pain level over the last 7 days? Scale values: NRS 0-100 (Mean Timepoint 2 - Timepoint 3 – mean Timepoint 1 - Timepoint 2) PLPP frequency reduction Question: Number of days with pain over the last 7 days? Weekly assessed Scale values: NRS 0-7 (Mean Timepoint 2 - Timepoint 3 – mean Timepoint 1 - Timepoint 2) Disability reduction

	PGQ, ODI Scale values: 0-100 (Mean Timepoint 3 – Timepoint 1) PLPP intensity + interference: weekly between Timepoint 1 and Timepoint 2 (3 months later), Timepoint 2 (3 months later) and Timepoint 3 (6 months later) Disability: Timepoint 1, Timepoint 3
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • Excluded women with a history of vertebral surgery or lumbar disc herniation. Other covariates • Weight loss at Timepoint 3 • Mean steps at Timepoint 3
RESULTS REGARDING ASSOCIATION	Higher levels of pain-related fear at 6.6 months pp: Not associated with improvement in disability 6 months later PGQ: adj β 0.283, p 0.125 ODI: adj β 0.196, p 0.281 Adj for weight loss at Timepoint 3, Mean steps at Timepoint 3 Not associated with reduction in PLPP intensity 6 months later Adj β: 0.053, p 0.791 Adj for weight loss at Timepoint 3, Mean steps at Timepoint 3 Not associated with reduction in PLPP frequency 6 months later Adj β: 0.003, p 0.990 Adj for weight loss at Timepoint 3, Mean steps at Timepoint 3 Anxiety at 6.6 months pp: Not associated with improvement in disability 6 months later Pearson correlation analysis Not associated with reduction in PLPP intensity 6 months later Pearson Correlation analysis Not associated with reduction in PLPP frequency 6 months later Pearson correlation analysis
AUTHORS (YEAR) **REFERENCE** **COUNTRY**	Olsson et al., 2012 (29) Sweden
DESIGN **MEASUREMENT POINTS**	Prospective study Prenatal: 1 Postpartum: 1

CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 470 Analysed: n = 273
	AGE	/
	BMI	/
	PARITY/GRAVIDITY	First pregnancy: No PLPP in week 19-21: n = 76/161 PLPP in week 19-21: n = 47/112 Pregnant before: No PLPP in week 19-21: n = 85/161 PLPP in week 19-21: n = 64/112
	EDUCATIONAL LEVELS	/
	PHYSICAL ACTIVITY LEVELS	Exercise before pregnancy (min 45 minutes/week) Yes: no PLPP in week 19-21: n = 124/161 PLPP in week 19-21: n = 73/112 No: No PLPP in week 19-21: n = 37/161 PLPP in week 19-21: n = 38/112 Exercise at present (minimum 45 min/week) (yes): No PLPP in week 19-21: n = 64/161 PLPP in week 19-21: n = 57/112
	PHYSICAL JOB DEMANDS	Occupation (working at present, students included, maternity leave and sick leave not included): Sedentary work: No PLPP in week 19-21: n = 113/161 PLPP in week 19-21: n = 63/112 Non-sedentary work: No PLPP in week 19-21: n = 40/161 PLPP in week 19-21: n = 35/112
	HISTORY OF LUMBOPELVIC PAIN	/
	HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
	LEVELS OF PAIN/DISABILITY DURING PREGNANCY	/

PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Pain catastrophising PCS Dichotomised using cut-off of 17 Pain-related fear FABQ-activity Dichotomised using cut-off of 12.3 T2 (week 19-21)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Presence of pain: Question: PLPP? Yes/no Dichotomised: • Self-reported PLPP • No self-reported PLPP 6 months postpartum
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • DRI-total index >25 • Exercise during pregnancy • Employment/occupation • Exercise before pregnancy • Previous pregnancies Other covariates: • Age • Marital status • Sick leave • Caesarean section • Onset lumbopelvic pain • Frequency lumbopelvic pain • Pain catastrophising • Pain-related fear
RESULTS REGARDING ASSOCIATION	Pain catastrophising at week 19-21: Associated with a higher risk of the presence of PLPP at 6 months pp in women with LP in weeks 19-21 Adj HR 2.05, CI 1.06-3.98, p 0.034 Adj for DRI-total index >25, exercise during pregnancy, onset of lumbopelvic pain Not associated with the presence of PLPP at 6 months pp in women without LP in weeks 19-21 Univariable regression analysis Pain-related fear at week 19-21: Not associated with the presence of PLPP at 6 months pp in women with LP in weeks 19-21 Univariable regression analysis

AUTHORS (YEAR)		Robinson et al. (2010) (31)
REFERENCE		
COUNTRY		Norway
DESIGN		Prospective cohort study
MEASUREMENT POINTS		Prenatal: 2
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 280 Analysed: n = 268
	AGE	Mean age: 31 yrs (SD 4)
	BMI	Mean pre-pregnancy BMI: 23.3 kg/m² (SD 3.5)
	PARITY/GRAVIDITY	Parity: 0: 59% 1: 32% ≥ 2: 9%
	EDUCATIONAL LEVELS	≤ 12 years school attendance: 17% ≤ 4 years university: 42% > 4 years university: 41%
	PHYSICAL ACTIVITY LEVELS	Physical activity before pregnancy: None: 4% < 2 hours per week: 31% 2-4 hours per week: 52% > 4 hours per week: 13%
	PHYSICAL JOB DEMANDS	Heavy work (yes): 36%
	HISTORY OF LUMBOPELVIC PAIN	Pre-pregnancy history of low back pain: 49%
	HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
	LEVELS OF PAIN/DISABILITY DURING PREGNANCY	DRI in early pregnancy: median 1.0 (range 0 – 6) DRI in gestation week 30: median 13 (0 – 93) Pain intensity in early pregnancy (worst evening pain): median 0 (0 – 82) Pain intensity in gestation week 30 (worst evening pain): median 14 (0 – 99)
PSYCHOLOGICAL FACTOR		Emotional distress
ASSESSMENT TOOL		HCSL-25
TIMING OF ASSESSMENT		Dichotomised using a cut-off of 1.75
		Pain-related fear
		FABQ-activity

	Scale values: 0-24 T2 (mean week 14, SD 3)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	PLPP intensity of evening pain VAS Scale values: 0-100 Disability DRI Scale values: 0-100 T3 (week 30)
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • Parity • Education • Physical activity before pregnancy • Pre-pregnancy BMI • Working condition • Pre-pregnancy history of low back pain Other covariates: • Gestation week in early pregnancy • Marital status • Use of contraceptive pills last year before pregnancy • Smoking • Full time work • Joint laxity • ASLR • Pain intensity at inclusion • Number of pain locations • Pain location • P4 test • Sum of pain provocation tests • DRI in early pregnancy • Emotional distress • Fear-avoidance beliefs
RESULTS REGARDING ASSOCIATION	Emotional distress at week 14: Associated with greater disability at week 30 Adj β 8.2, CI 2.3-14.0, p 0.006 Adj for pain location, P4 test, sum of pain provocation tests Not associated with disability at week 30 Adj β 2.0, CI 3.7-7.7, p 0.49 Adj for pain location, P4 test, sum of pain provocation tests, DRI at baseline

		Not associated with PLPP intensity at week 30 Adj 1 + 2 (exact values not shown) Adj 1: for pain location, P4 test, sum of pain provocation tests, DRI in early pregnancy, adj 2: for pain location, P4 test, sum of pain provocation tests, PLPP intensity in early pregnancy Higher levels of pain-related fear measured in week 14: Not associated with disability at week 30 Adj 1 + 2 (exact values not shown) Adj 1: for pain location, P4 test, sum of pain provocation tests, DRI in early pregnancy, adj 2: for pain location, P4 test, sum of pain provocation tests, DRI in early pregnancy Not associated with PLPP intensity at week 30 Adj 1 + 2 (exact values not shown) Adj 1: for pain location, P4 test, sum of pain provocation tests, DRI in early pregnancy, adj 2: for pain location, P4 test, sum of pain provocation tests, PLPP intensity in early pregnancy
AUTHORS (YEAR) **REFERENCE** **COUNTRY**		Robinson et al., 2010b (28) Norway
DESIGN **MEASUREMENT POINTS**		Prospective cohort study Prenatal: 1 Postpartum: 1
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 326 Analysed: n = 179 (women without PGP during pregnancy were excluded)
	AGE	Mean age: 31 yrs (SD 4)
	BMI	Mean pre-pregnancy BMI: 23.5 kg/m² (SD 3.7)
	PARITY/GRAVIDITY	Parity: 0: 55% 1: 36% ≥ 2: 9%
	EDUCATIONAL LEVELS	≤ 12 years school attendance: 20% ≤ 4-year university: 41% > 4 years university: 39%
	PHYSICAL ACTIVITY LEVELS	Pre-pregnancy physical activity: None: 4% < 2 hours per week: 31% 2-4 hours per week: 50% > 4 hours per week: 14%

PHYSICAL JOB DEMANDS	/
HISTORY OF LUMBOPELVIC PAIN	Pre-pregnancy history of low back pain: 50%
HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
LEVELS OF PAIN/DISABILITY DURING PREGNANCY	/
PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Emotional distress HCSL-25 Dichotomised using a cut-off of 1.75 Pain-related fear FABQ-activity Scale values: 0-24 T3 (week 30)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	PLPP intensity for evening pain VAS Scale values: 0-100 Disability DRI Scale values: 0-100 12 weeks pp
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • Parity • Education • Pre-pregnancy BMI • Pre-pregnancy physical activity • Pre-pregnancy Low back pain Other covariates: • Age • Marital status • Smoking • Pain locations • Pain in other bodily areas • The P4 test • Sum of pain provocation tests • Number of pain sites • Evening pain at 12 weeks postpartum • ASLR • Emotional distress

		• Fear-avoidance beliefs
RESULTS REGARDING ASSOCIATION		Emotional distress at week 30: Not associated with disability at 12 weeks pp Spearman correlation analysis Not associated with PLPP intensity at 12 weeks pp Spearman correlation analysis Higher levels of pain-related fear at week 30: Not associated with disability at 12 weeks pp Adj (exact values not shown) Adj for pre-pregnancy BMI, Pre-pregnancy low back pain, sum of pain provocation tests, ASLR not associated with PLPP intensity at 12 weeks pp Adj (exact values not shown) Adj for pre-pregnancy BMI, Pre-pregnancy low back pain, sum of pain provocation tests, ASLR
AUTHORS (YEAR) **REFERENCE** **COUNTRY**		Stomp-van den Berg et al., 2012 (30) The Netherlands
DESIGN **MEASUREMENT POINTS**		Prospective cohort study Prenatal: 1 Postpartum: 1
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 598 Analysed: n = 548
	AGE	Mean age: 32 yrs (SD 4)
	BMI	BMI (categories): < 18.5: 3.7% 18.5-25: 66.2% 25-30: 23.6% > 30: 6.6%
	PARITY/GRAVIDITY	Parity: 1: 48.9% 2: 31.8% 3: 13.9% ≥ 4: 5.4%
	EDUCATIONAL LEVELS	Highest education level: Low: 8.4% Medium: 33.1% High: 58.5%

PHYSICAL ACTIVITY LEVELS	/
PHYSICAL JOB DEMANDS	Type of work: Mainly sitting: 33.4% Standing or standing/sitting: 25.0% Physical active or heavy work: 41.6%
HISTORY OF LUMBOPELVIC PAIN	Pelvic girdle pain at week 30 of pregnancy: 73%
HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
LEVELS OF PAIN/DISABILITY DURING PREGNANCY	PGP at 30 week pregnancy: Median pain, including 0: 2.8 Median pain, excluding 0: 4.3
PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Coping UCL (passive reaction approach) Dichotomised using a cut-off of 11 Emotional distress 4DSQ-distress Scale values: 0-32 Anxiety 4DSQ-anxiety Scale values: 0-24 Depression EPDS Scale values: 0-30 T3 (week 30), 6 weeks pp
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Presence of pain Question: PLPP? Yes/no Dichotomised: • Self-reported PLPP • No self-reported PLPP 12 weeks pp
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • History of back/pelvic pain • History of pregnancy-related back and/or pelvic pain • Disability • Mean pain intensity • Pre-pregnancy body weight

	• Education • Type of job • Parity Other covariates: • Age • Marital status • Body height • Income • Ethnicity • Fatigue • Work-related predictors • Pregnancy-related predictors • Psychosocial predictors • Smoking behaviour • Alcohol use during pregnancy • Delivery-related predictors • Pelvic girdle pain at 30 weeks pregnancy
RESULTS REGARDING ASSOCIATION	Passive coping at week 30: Not associated with the presence of PLPP at 12 weeks pp Adj cluster model psychosocial factors Higher levels of emotional distress at week 30: Not associated with the presence of PLPP at 12 weeks pp Adj cluster model psychosocial factors Higher levels of anxiety levels at week 30: Not associated with the presence of PLPP at 12 weeks pp Univariable regression analysis Higher levels of depression at week 30: not associated with the presence of PLPP at 12 weeks pp Adj (exact values not shown) Adj for history of back/pelvic pain, hours of sleep/rest a day, uncomfortable posture Higher levels of emotional distress at 6 weeks pp: Not associated with the presence of PLPP at 12 weeks pp Adj cluster model psychosocial factors Higher levels of anxiety at 6 weeks pp Not associated with the presence of PLPP at 12 weeks pp Adj cluster model psychosocial factors Higher levels of depression at 6 weeks pp

		Not associated with the presence of PLPP at 12 weeks pp Univariable regression analysis
AUTHORS (YEAR) **REFERENCE** **COUNTRY**		Xiangsheng et al., 2021 (40) China
DESIGN **MEASUREMENT POINTS**		Prospective study Prenatal: 1 Postpartum: 1
CHARACTERISTICS OF THE SAMPLE	**SAMPLE SIZE**	Included: n = 387 Analysed: n = 264 (Women without PLPP during pregnancy were excluded)
	AGE	Mean age No persistent PLPP (n = 184): 26.3 yrs (SD 4.5) Persistent PLPP (n = 80): 26.5 yrs (SD 4.7)
	BMI	Mean pre-pregnancy BMI: No persistent PLPP (n = 184): 23.2 kg/m² (SD 2.0) Persistent PLPP (n = 80): 22.5 kg/m² (SD 1.8)
	PARITY/GRAVIDITY	Primigravida: No persistent PLPP: 73.9% Persistent PLPP: 70.0%
	EDUCATIONAL LEVELS	≥ high school/university: No persistent PLPP: 71.7% Persistent PLPP: 68.8%
	PHYSICAL ACTIVITY LEVELS	/
	PHYSICAL JOB DEMANDS	/
	HISTORY OF LUMBOPELVIC PAIN	Pelvic girdle pain in previous pregnancy: No persistent PLPP: 26.1% Persistent PLPP: 55.0% History of other low back pain (specific and other unspecific low back pain) was an exclusion criterion
	HISTORY OF TRAUMA TO THE SPINE/PELVIC GIRDLE	/
	LEVELS OF PAIN/DISABILITY DURING PREGNANCY	/
PSYCHOLOGICAL FACTOR **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**		Agreeableness QBFPT Scale values: 6-42

	Extraversion QBFPT Scale values: 6-42 Conscientiousness QBFPT Scale values: 6-42 Neuroticism QBFPT Scale values: 6-42 Openness to experience QBFPT Scale values: 6-42 T1 (week 12)
PLPP OUTCOME **ASSESSMENT TOOL** **TIMING OF ASSESSMENT**	Presence of pain (yes/no): Persistent pain score ≥ 3 over a week (VAS 0-10) Dichotomised using cut-off 3/10 2 years pp
KEY COVARIATES **OTHER COVARIATES**	Key covariates: • Parity • BMI • Education • Pelvic girdle pain in previous pregnancy • History of other low back pain was an exclusion criterion Other covariates: • Income • Maternal age • No or rare ability to take rest breaks at work • Caesarean delivery • Breastfeeding • Unexpected sex of the baby • Sick leave
RESULTS REGARDING ASSOCIATION	Higher levels of neuroticism at week 12: Associated with increased odds of the presence of PLPP at 2 years pp Adj OR 2.03, CI 1.92-2.13, p 0.002 Adj for parity, education, pelvic girdle pain in previous pregnancy, income, maternal age, no or rare ability to take rest breaks at work

		Lower levels of extraversion at week 12: Associated with increased odds of the presence of PLPP at 2 years pp Adj OR 0.79, CI 0.71-0.87, p 0.004 Adj for parity, education, pelvic girdle pain in previous pregnancy, income, maternal age, no or rare ability to take rest breaks at work Lower levels of conscientiousness at week 12: Associated with increased odds of the presence of PLPP at 2 years pp Adj OR 0.92, CI 0.87-0.97, p 0.021 Adj for parity, education, pelvic girdle pain in previous pregnancy, income, maternal age, no or rare ability to take rest breaks at work Lower levels of agreeableness at week 12: Not associated with the presence of PLPP at 2 years pp Adj OR 0.88, CI 0.83-0.93, p 0.626 Adj for parity, education, pelvic girdle pain in previous pregnancy, income, maternal age, no or rare ability to take rest breaks at work Higher levels of openness to experience at week 12: Not associated with the presence of PLPP for PLPP intensity at 2 years pp Adj OR 1.23, CI 1.12-1.34, p 0.928 Adj for parity, education, pelvic girdle pain in previous pregnancy, income, maternal age, no or rare ability to take rest breaks at work

Abbreviations: T1: first trimester, T2: second trimester, T3: third trimester, PLPP: pregnancy-related lumbopelvic pain, SD: standard deviation, β: beta coefficient, OR: odds ratio, HR: hazard ratio, adj: adjusted, CI: confidence interval, P4: Posterior Pelvic Pain Provocation, BMI: body mass index, pp: postpartum, HADS-D: Hospital Anxiety and Depression Scale - Depression, PSS: Perceived Stress Scale, PRAQ: Pregnancy-Related Anxiety Questionnaire, SCL-90-R: Symptom Checklist -90- Revised, UCL: Utrecht Coping List, OCI: Overall Complaints Index, PMI: Pregnancy Mobility Index, HSCL: Hopkins Symptom Checklist, PCS: Pain Catastrophizing Scale, PHQ: Patient Health Questionnaire, BPI: Brief Pain Inventory, MDI: Major Depression Inventory, ASLR: Active Straight leg raise, ASS: Anxiety Symptom Scale, (m)FABQ: (modified) Fear-Avoidance Beliefs Questionnaire, TSK: Tampa Scale of Kinesiophobia, STAI: State-Trait Anxiety Inventory, VAS: Visual Analogue Scale, NRS: Numerical Rating Scale, PGQ: Pelvic Girdle Questionnaire, ODI: Oswestry Disability Index, DRI: Disability Rating Index, 4DSQ: Four-Dimensional Symptom Questionnaire, EPDS: Edinburgh Postnatal Depression Scale, QBFPT: Big Five Personality Test