Pelvic floor training during pregnancy for the prevention of pre- and postpartum urinary incontinence[1]

EXTRACT

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Pelvic Floor, Exercise Therapy, Pregnancy, Benefit Assessment, Systematic Review

This report was prepared in collaboration with external experts.

The responsibility for the contents of the report lies solely with IQWiG.

According to §139b (3) No. 2 of Social Code Book (SGB) V, Statutory Health Insurance, external experts who are involved in the Institute's research commissions must disclose "all connections to interest groups and contract organizations, particularly in the pharmaceutical and medical devices industries, including details on the type and amount of any remuneration received". The Institute received the completed Form for disclosure of potential conflicts of interest from each external expert. The information provided was reviewed by a Committee of the Institute specifically established to assess conflicts of interests. The information on conflicts of interest provided by the external experts and external reviewers is presented in Chapter A8 of the full report. No conflicts of interest were detected that could endanger professional independence with regard to the work on the present commission.

External experts

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IQWiG thanks the external expert for her collaboration in the project.

Patient and family involvement

Patients or family members were consulted during the preparation of the report.

Two people participated in the discussion.

The aim of the discussion was to gather information on the following topics: expectations regarding the preventive measure and motivation to participate; any previous experience with the measure and symptoms to be avoided; and any wishes or concerns regarding the preventive measure.

IQWiG would like to thank the participants for taking part in the discussion. The participants were not involved in the actual preparation of the report.

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Key statement

Research question

The aim of this investigation is the benefit assessment of pelvic floor training during pregnancy for the prevention of pre- or postpartum urinary incontinence, in comparison with other measures available in Germany for the prevention of urinary incontinence, or with no preventive measures at all, in pregnant women without symptoms of urinary incontinence.

Conclusion

Based on the available evidence, first-time mothers with singleton pregnancies who conduct prepartum pelvic floor training are less likely to experience urinary incontinence both during pregnancy and in the first weeks after delivery than women who do not undergo such training. There is therefore an indication of a greater benefit of additional pelvic floor training in comparison with standard care alone, both for the prevention of prepartum urinary incontinence and for the prevention of postpartum urinary incontinence up to 3 months after delivery. The reported advantages of pelvic floor training in terms of prepartum health-related quality of life are clearly impaired by unpublished results. Consequently, following the downgrading of the certainty of conclusions, no conclusion regarding the benefit could be derived for this outcome.

For other outcomes, such as pre- and postpartum faecal incontinence, postpartum pain or sexual function, there was no benefit or harm of pelvic floor training based on the available study data. This was partly due to a lack of differences between the comparator groups, and partly to a lack of study results which were not reported, although their recording had been planned.

No potential side effects of pelvic floor training were reported in the included studies. Given the mode of action of pelvic floor training, serious adverse events in particular were not to be expected either. Consequently, the results relating to the course of labour were also taken into account when interpreting the risk of harm associated with pelvic floor training; these results showed no adverse effect to the disadvantage of pelvic floor training in comparison with standard care alone for the mode of birth based on spontaneous births, higher-grade perineal tears, preterm births and premature rupture of membranes.

Taking all the results together, there is an indication of a greater benefit of additional pelvic floor training for first-time mothers with singleton pregnancies in comparison with standard care alone.

Table of contents

List of tables

Page

List of abbreviations

Abbreviation	Meaning
AE	adverse event
AHRQ	Agency for Healthcare Research and Quality
CI	confidence interval
CINAHL	Cumulative Index to Nursing and Allied Health Literature
FSFI	Female Sexual Function Index
G-BA	Gemeinsamer Bundesausschuss (Federal Joint Committee)
GW	gestational week
HRQoL	health-related quality of life
HTA	health technology assessment
ICIQ-UI SF	International Consultation on Incontinence Questionnaire – Urinary Incontinence Short Form
IIQ	Incontinence Impact Questionnaire
IIQ-7	Incontinence Impact Questionnaire – Short Form
IQWiG	Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen (Institute for Quality and Efficiency in Health Care)
ITT	intention to treat
NICE	National Institute for Health and Care Excellence
PFDI-20	Pelvic Floor Distress Inventory – Short Form 20 (PFDI-20)
PFM	pelvic floor muscles
PFT	pelvic floor training
RCT	randomized controlled trial
SAE	serious adverse event
SF-36	Short Form 36
SGB	Sozialgesetzbuch (Social Code Book)
SR	systematic review
UDI-6	Urogenital Distress Inventory – Short Form
UI	urinary incontinence

1 Background

During pregnancy, expectant mothers undergo a wide range of physical changes, including alterations to their hormone balance and metabolic processes. This can lead to various symptoms and complications in the run-up to the birth. A common problem is the changes to the pelvic floor caused by pregnancy. The multiple layers of muscle, connective tissue, ligaments and nerve pathways form the lower boundary of the pelvic cavity, thereby supporting the organs in the lower abdomen, such as the bladder, the rectum and the uterus. The pelvic floor also supports voluntary control of the urethra and rectum [1,2]. Due to hormone-induced changes in the connective tissue and the resulting reduction in muscle contractility [3,4], the pelvic floor is subjected to increasing strain throughout pregnancy due to the growing weight of the baby and descends [5]. This can lead to pelvic floor dysfunction and, as a result, to urinary or faecal incontinence, impaired sexual function, or even pelvic organ prolapse [6,7].

Urinary incontinence in particular – defined as any involuntary loss of urine [8,9] – as the most common symptom of a pelvic floor disorder, places a considerable burden on the women affected, both pre- and postpartum [10,11]. It often occurs in the form of so-called stress incontinence, more rarely as urge incontinence or as a mixed form of these 2 types [11-13]. Whilst urge incontinence is caused by excessive activity or sensitivity of the bladder muscles and an associated urgency to urinate, stress incontinence is caused by increased intraabdominal pressure during physical activity or, for example, when sneezing, leading to involuntary urine leakage [14,15]. According to the Ingelman-Sundberg classification, the symptoms of stress incontinence can be divided into the following 3 severity grades. Whilst in grade I of the classification, urine leaks involuntarily only when coughing, sneezing or laughing, in grade 2 there is leakage during lifting, walking or climbing stairs. Grade 3 is diagnosed when urine leakage occurs whilst only standing without engaging in any physical activity [15,16].

A meta-analysis [17] on the prevalence of prepartum urinary incontinence showed that 41% of all women experience involuntary urine leakage at some point during their pregnancy. The symptoms often occur only sporadically (e.g. once a month), but become more frequent as the pregnancy progresses. The risk of developing urinary incontinence remains even postpartum. According to a Norwegian survey conducted in women 6 months after their first childbirth, around 20% experience urinary incontinence for the first time; the rate of incontinence following a spontaneous vaginal delivery (23%) is notably higher than following a caesarean section (8%) [12]. The risk of postpartum urinary incontinence is further increased by the use of obstetric instruments (e.g. forceps or suction cup), by a high birth weight or a large head circumference of the baby [12], and by general maternal risk factors such as previous pregnancies, being severely overweight or a family history of the condition, and increases with the mother's age at the time of birth [7].

In addition to general measures, such as preventing constipation or losing weight after childbirth, current guidelines recommend strengthening pelvic floor function during pregnancy through prepartum pelvic floor training (PFT), to prevent postpartum pelvic floor disorder and resulting urinary incontinence [7,15]. According to the guidelines, this type of training—involving deliberate, isolated contractions of the pelvic floor muscles—should be conducted regularly and under supervision (e.g. by a physiotherapist) for at least 3 months [15,18] and is also intended to prevent symptoms of incontinence even before childbirth [19]. Pelvic floor training can optionally be supported by biofeedback monitoring (to measure the electrical activity of the pelvic floor muscles) [15].

In Germany, however, PFT for the prevention of urinary incontinence is not currently reimbursable as a medical prescription under the Remedies Directive [20]. For women during or after pregnancy, the only option is to receive such training through certified prevention courses in accordance with §20 of the German Social Code Book V, and, provided they attend regularly, to receive a pro rata refund of the course fees from their health insurance fund [21].

2 Research question

The aim of this investigation is the benefit assessment of pelvic floor training during pregnancy for the prevention of pre- or postpartum urinary incontinence, in comparison with other measures available in Germany for the prevention of urinary incontinence, or with no preventive measures at all, in pregnant women without symptoms of urinary incontinence.

3 Methods

The target population for the benefit assessment was pregnant women with no already existing symptoms of urinary incontinence. The experimental intervention was pelvic floor training during pregnancy. The comparison intervention comprised any other reimbursable measures for the prevention of urinary incontinence in Germany, or no preventive measures at all.

The following patient-relevant outcomes were taken into account in the assessment:

- Mortality
- Morbidity
  - in particular pre- and postpartum urinary incontinence,
  - pre- and postpartum faecal incontinence,
  - the burden of pelvic floor symptoms,
  - postpartum pain and
  - outcomes on sexual function
- Health-related quality of life
- Outcomes relating to the labour (mode of birth, perineal tears, and preterm birth or premature rupture of membranes)
- Side effects

Only randomized controlled trials (RCTs) were included in the benefit assessment. There were no restrictions regarding the study duration.

In parallel with the development of the report plan, a search for systematic reviews was conducted in the MEDLINE database (which also includes the Cochrane Database of Systematic Reviews) and the HTA Database, as well as on the websites of the National Institute for Health and Care Excellence (NICE) and the Agency for Healthcare Research and Quality (AHRQ).

It was ascertained whether at least one high-quality, current systematic review existed whose information retrieval could be used as a suitable basis (hereinafter: basic SR).

If that was the case, a second step followed, in which a supplementary search was conducted for studies for the time period not covered by the basic SR(s). Otherwise, the search for studies was conducted without any time restrictions.

The systematic literature search for studies was conducted in the following databases: MEDLINE, Embase, the Cochrane Central Register of Controlled Trials and the Cumulative Index to Nursing and Allied Health Literature (CINAHL).

In addition, the following information sources and search techniques were considered: study registries, documents sent by the Federal Joint Committee (G-BA), the screening of reference lists from identified systematic reviews and author queries.

The selection of relevant studies was performed by 2 people independently of each other, who resolved any discrepancies by discussion. Data were extracted into standardized tables. To assess the qualitative certainty of results, risk of bias criteria across outcomes and outcome-specific risk of bias criteria were assessed, and the risk of bias was rated as low or high in each case. The results of the individual studies were described, organized by outcomes.

In addition to comparing the results of the individual studies, meta-analyses and sensitivity analyses were conducted and effect modifiers were investigated, provided that the methodological prerequisites had been met.

For each outcome, a conclusion was drawn regarding the evidence base for (greater) benefit or (greater) harm, with 4 levels of certainty of conclusions: There was either proof (highest certainty of conclusions), indication (moderate certainty of conclusions), hint (lowest certainty of conclusions), or none of those 3 situations. The latter was the case if either no data were available or the available data did not allow any of the other 3 conclusions to be drawn. In this case, the conclusion ‘There is no hint of (greater) benefit or (greater) harm’ was drawn.

Finally, an assessment across all outcomes of the benefits and harms was carried out.

4 Results

4.1 Results of the information retrieval

No systematic review was taken into account as a basic SR for the identification of primary studies.

The information retrieval identified 11 RCTs relevant to the research question. Since in 1 (Szumilewicz 2019 [22]) of these 11 studies only results for less than 70% of the randomized women were available, and these results were therefore not usable for this assessment, the following sections do not include a description of the study results.

No planned or ongoing RCTs were identified. Two RCTs with an unclear status and 2 completed RCTs with no reported results were identified.

The search strategies for bibliographic databases and trial registries can be found in the appendix. The last search was conducted on 27 May 2025.

Table 1: Study pool of the benefit assessment

Study	Available documents		
	Full publication (in scientific journals)	Registry entry / results report from trial registries	Other documents
He 2023	yes [23]	yes [24] / no	no
Jinapun 2024	yes [25]	yes [26] / no	no
Lekskulchai 2014	yes [27]	no / no	no
Mørkved 2003	yes [28]	no / no	no
Pelaez 2014	yes [29]	yes [30] / no	no
Reilly 2002	yes [31-33]	no / no	no
Sangsawang 2016	yes [34]	no / no	no
Sobhgol 2022	yes [35,36]	yes [37] / no	no
Stafne 2012	yes [38-40]	yes [41] / no	no
Szumilewicz 2019[a]	yes [22]	yes [42] / no	no
Zhang 2025	yes [43]	yes [44] / no	no
a. Study does not contain any usable data.			

4.2 Characteristics of the studies included in the assessment

The RCTs included were conducted between 1998 and 2024 in countries such as Thailand, Norway and Spain (see Table 2). These studies included between 70 and 500 pregnant women each, most of whom were first-time mothers carrying a single foetus and who had not previously shown any symptoms of urinary incontinence (UI). Only in one study (Zhang 2025 [43]) was it unclear to what extent the study population met this criterion, or what proportion

of the women already showed symptoms of UI at the time of recruitment. A request for comment from the author went unanswered. Given that recruitment began as early as the 8th week of pregnancy, it stands to reason that there were at least no new cases of pregnancy-induced urinary incontinence in the study population.

In all the studies included, pelvic floor training was carried out during pregnancy using targeted, isolated contractions of the pelvic floor muscles (PFM), in addition to standard prepartum care. In 6 of the studies, the experimental intervention was described as a standalone PFT, without any additional supporting activities. In other studies, however, PFT was incorporated into a comprehensive physical exercise session: For example, in Pelaez 2014 [29], out of a total duration of 55 to 60 minutes, 10 minutes were set aside exclusively for PFT, while an aerobic session carried out at the same time for cardiovascular and general strength training took around 30 minutes.

In 6 of the studies, PFT was continued independently—that is, without further guidance—in the home environment following an initial training session (provided by physiotherapists, for example). In some cases, training took the form of (up to 3) weekly guided group sessions. Only 6 studies in total reported an initial (usually vaginal palpation-based) assessment of PFM contractions to ensure correct contraction.

Table 2: Overview of study characteristics

Study	N	Women recruited	Duration of PFT	Study location and time period	Study duration
He 2023	200[a]	First-time mothers with a singleton pregnancy	GW 34 until delivery	China; Nov 2020 to Oct 2021	Until 6 wks postpartum
Jinapun 2024	150	First-time mothers with a singleton pregnancy	12 wks, starting GW 20 to 24	Thailand; Aug 2019 to June 2020	Until GW 36 to 38
Lekskulchai 2014	219	First-time mothers with a singleton pregnancy	At the latest from GW 12 (duration unclear)	Thailand; ND	Until 6 mths postpartum
Mørkved 2003	301[b]	First-time mothers with a singleton pregnancy	12 wks, between GW 20 and 36	Norway; Oct 1998 to April 2001	Until 3 mths postpartum
Pelaez 2014	169	First-time mothers with a singleton pregnancy	22 wks, from GW 14 to 36	Spain; Oct 2009 to June 2011	Until GW 36 to 40
Reilly 2002	268	First-time mothers	From GW 20 until delivery	Great Britain; 1998 to 1999	Until 8 yrs postpartum
Sangsawang 2016	70	First-time mothers with a singleton pregnancy	6 wks, starting GW 20 to 30	Thailand; July 2012 to Mar 2013	Until GW 38
Sobhgol 2022	202	First-time mothers with a singleton pregnancy	From GW 20 until delivery	Australia; Feb 2018 to June 2019	Until 3 mths postpartum
Stafne 2012	855[b]	Women with a singleton pregnancy	12 wks, between GW 20 and 36	Norway; April 2007 to June 2015	Until 7 yrs postpartum
Szumilewicz 2019[c]	166	Women with a singleton pregnancy	6 wks	Poland; Oct 2015 to May 2016	6 wks from baseline
Zhang 2025	440	Women with a singleton pregnancy	From GW 8 to 10 to around GW 38 to 40	Spain; Sep 2020 to Jan 2024	Until 3 mths postpartum

a. For this assessment, only the study arm receiving PFT (N = 50) and the control group (N = 50) were used.
b. For this assessment, only the results from the subpopulation without urinary incontinence at the time of recruitment were used (Mørkved 2003: N = 207; Stafne 2012: N = 500).
c. No usable results were reported for this study.

GW: gestational week; mths: months; ND: no data; PFT: pelvic floor training; wks: weeks; yrs: years

Furthermore, the start date and duration of PFT varied between studies: Whilst PFT was conducted from gestational week (GW) 20 onwards in 6 studies, in other studies training began as early as GW 8 to 10 [43] (depending on the recruitment timepoint), or in GW 14 [29], or even only from GW 34 onwards [23]. In most cases, training continued right up until just before delivery (i.e. for a duration of up to 32 weeks) or was limited to a duration of between 6 (Sangsawang 2016 [34]) and 22 weeks (Pelaez 2014 [29]). The way in which the individual PFT exercises were conducted also varied: Depending on the study, at least 2 to 3 units with up to 20 PFM contractions each were to be completed on 3 to 7 days per week. Each contraction should last between 5 and 10 seconds and be followed by a relaxation phase of

the same duration. In some of the studies, the contractions had to be held in different positions (sitting, standing or lying down).

In all the included studies, standard prepartum care alone served as the control intervention. No specific information was provided regarding the respective context-specific scopes and processes. In several studies (Pelaez 2014, Reilly 2002, Sobhgol 2022 and Stafne 2012), both study groups received information regarding the relevance of and performance of PFT as an additional accompanying intervention. In Mørkved in 2003, both study groups underwent individual PFT training as an accompanying intervention. However, the weekly reminders and requests to document the PFT sessions completed were sent exclusively to the women in the intervention group.

No studies comparing additional prepartum PFT with other relevant interventions were identified.

4.3 Overview of patient-relevant outcomes

Usable data on patient-relevant outcomes were extracted from 10 of the 11 included studies. The results from Szumilewicz 2019 were not usable for any of the reported outcomes, as in each case fewer than 70% of the randomized women were included in the analyses.

Table 3 presents an overview of the available data on patient-relevant outcomes from the included studies. It can also be seen from the table that with regard to potential side effects, it was only reported that no (serious) adverse events ([S]AE) related to PFT were observed.

Table 3: Matrix of patient-relevant outcomes (multipage table)

Study	Outcomes										
	Mortality	Morbidity					QoL	Effects on labour			Side effects
	All-cause mortality	Urinary incontinence (pre-/postpartum)	Faecal incontinence (pre-/postpartum)	Burden of pelvic floor symptoms	Postpartum pain	Sexual functioning (pre-/postpartum)	Health-related quality of life (pre-/postpartum)	Mode of birth	Perineal injuries	Preterm birth / premature rupture of the membranes	(Serious) adverse events
He 2023	–	–	– / –	●	x	–	– / –	●	●	● / ●	–
Jinapun 2024	–	●[a] / –	– / –	–	–	–	●[b] / –	○[c]	–	–	–
Lekskulchai 2014	–	● / ●	– / –	–	–	–	– / –	●	–	–	–
Mørkved 2003	–	● / ●	– / –	–	–	–	– / –	–	–	–	○[d]
Pelaez 2014	–	● / –	– / –	–	–	–	x[e] / –	–	–	–	–
Reilly 2002	–	– / ●[f]	– / –	–	–	–	– / ○[g]	●	●	–	–
Sangsawang 2016	–	● / –	– / –	–	–	–	– / –	–	–	–	○[d]
Sobhgol 2022	–	x[h] / x[h, i]	x[j] / x[i, j]	–	–	●[k] / ●[k]	x[b] / x[b, i]	●	●	–	–
Stafne 2012	–	● / ●[l]	x[m]/ x[m]	–	–	–	– / –	–	–	–	○[d]
Szumilewicz 2019	–	○[i] / –	– / –	–	–	–	○[i, n] / –	–	–	–	○[d]
Zhang 2025	–	● / ○[i]	– / –	–	–	–	– / –	–	○[i]	–	–

Table 3: Matrix of patient-relevant outcomes (multipage table)

Study	Outcomes										
	Mortality	Morbidity					QoL	Effects on labour			Side effects
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●: Data were reported and were usable.
○: Data were reported, but were not usable for the benefit assessment.
x: Data were not reported although their recording had been planned.
–: No data were reported (no further details) / The outcome was not recorded.
a. The outcome was recorded using the Urogenital Distress Inventory – Short Form (UDI-6). Due to the operationalization, it remains unclear to what extent the reported results accurately classify urinary incontinence. Consequently, only the findings relating to the impact of urinary incontinence were drawn from this study.
b. Using the Incontinence Impact Questionnaire – Short Form (IIQ-7).
c. No detailed information on the mode of birth (e.g. proportion of operative vaginal delivery or primary caesarean section).
d. The only finding reported is that no (serious) adverse events were observed in relation to pelvic floor training.
e. According to the trial registry entry, recording was to be conducted using the King's Health Questionnaire.
f. The long-term data after 8 years were not usable, as the analysis included < 70% of the randomized women.
g. No usable results were reported for the King's Health Questionnaire and the Short Form-36 (SF-36). Furthermore, the SF-36 analyses included < 70% of the randomized women.
h. Using the Urogenital Distress Inventory – Short Form (UDI-6).
i. <70 % of the randomized women were included in the analysis.
j. Using the Wexner Faecal Incontinence – Short Form questionnaire.
k. Using the Female Sexual Function Index (FSFI).
f. The long-term data after 7 years were not usable, as the analysis included < 70% of the randomized women.
m. Using the St Mark's score.
n. Using the Incontinence Impact Questionnaire (IIQ).

QoL: health-related quality of life

4.4 Assessment of the risk of bias of the results

For 9 of the included and usable studies, the risk of bias across outcomes was rated as high. This was due, among other things, to the fact that the information required for allocation concealment was generally lacking. Consequently, for most studies it was unclear to what extent the allocation was predictable and, therefore, whether it was possible to influence the allocation accordingly. Furthermore, none of the studies involved blinding of the study populations or the health care professionals. Regardless of whether such blinding is feasible in principle, this gives rise to the risk of systematic bias in the results. This applies not only to subjective outcomes such as pain, but can also influence the decisions made by health care professionals (e.g. performing a secondary caesarean section). In addition, it was at least unclear for all of these 9 studies, and in some cases also proven, that selective or results-driven reporting took place; for instance, a study design was published for only one (Sobhgol 2022) of the included studies, and a corresponding study registry entry could be identified for only 6 of the usable studies. In 6 of these studies, it emerged that the planned outcomes deviated in terms of their operationalizations or analysis time points, or in some cases were not reported at all. The high risk of bias across outcomes for the studies was directly transferred to the outcome-specific risk of bias of the results. For this reason, none of the 9 studies underwent an assessment of outcome-specific criteria.

Only one study (Jinapun 2024) showed a low risk of bias across all outcomes. As this study provided usable results only regarding the impact of prepartum urinary incontinence and health-related quality of life—and thus only regarding subjective outcomes—the outcome-specific risk of bias was assessed as high, due to the lack of blinding of the participants and the inadequate application of the intention-to-treat (ITT) principle.

For the Szumilewicz 2019 study, which did not report any usable results (see Section 4.3), neither the outcome-specific risk of bias nor the risk of bias across outcomes was assessed.

4.5 Results on patient-relevant outcomes

4.5.1 Results on (all-cause) mortality

The included studies did not report any results for the outcome category mortality (e.g. all-cause mortality).

Consequently, no hint of a greater benefit or harm of additional prepartum pelvic floor training in comparison with standard care alone could be derived for any mortality outcomes.

4.5.2 Results on urinary incontinence (pre- and postpartum)

4.5.2.1 Results on prepartum urinary incontinence

Findings on prepartum urinary incontinence were reported both as dichotomous data and using scales. The dichotomous results from the Jinapun 2024 study were not usable in this context, as an inadequate operationalization of the Urogenital Distress Inventory – Short Form (UDI-6) total score was used to determine urinary incontinence. No results were reported for the recording of prepartum urinary incontinence at gestational week (GW) 36 as planned in Sobhgol 2022. A request for comment from the author went unanswered. Furthermore, in 2 studies (Lekskulchai 2014 and Sangsawang 2016), the recording of urinary incontinence was limited to urine leakage when sneezing, coughing or engaging in physical activity, and thus to symptoms of stress incontinence. In the other studies, urinary incontinence episodes were not differentiated between.

The meta-analytical summary of the dichotomous data from 5 studies revealed a heterogeneous result ($p = 0.007$), partly due to a very large effect in favour of the experimental intervention in the Pelaez 2014 study, meaning that a common effect estimation was not initially feasible. No factor could be identified that could explain the heterogeneity. By artificially reducing the most extreme effect estimate towards the zero effect to a situation that was no longer statistically meaningful in terms of heterogeneity, an artificial situation was created that could be used to calculate a common effect estimate. This resulted in a statistically significant pooled odds ratio in favour of the experimental intervention, which was used to derive the evidence base. The statistically significant overall estimate remained unchanged in a sensitivity analysis without the results of the Zhang 2025 study, for which some of the baseline characteristics of the study participants were unknown (see Section 4.2). Furthermore, the Lekskulchai 2014 study also reported a statistically significant effect in favour of the experimental intervention. As further details were missing, this result could not be included in the meta-analysis.

The results from the continuous recording of the severity of prepartum urinary incontinence pointed in the same direction; Thus, in the assessment of the total score of the UDI-6 and its associated subscales (Jinapun 2024), as well as in the assessment of the total score of the International Consultation on Incontinence Questionnaire – Urinary Incontinence Short Form (ICIQ-UI SF) (Pelaez 2014), a statistically significant reduction in UI-related impairment was observed among women in the intervention group compared with the control group. Whilst the relevance of the effect from Jinapun 2024 could not be assessed on the basis of the available results (median and interquartile range), the 95% confidence interval (CI) for Hedges' g (−0.74 [95% CI: −1.08; −0.41]) for the results on the ICIQ-UI SF total score was fully below the irrelevance threshold (−0.2).

Furthermore, the women in the test group rated the perceived severity of prepartum urinary incontinence (Sangsawang 2016) as statistically significantly lower than the women in the control group. With regard to the amount of involuntary urine leakage, the results for the affected women in 2 studies (Pelaez 2014 and Sangsawang 2016) were not statistically significant. With regard to the frequency of such urine leakage, only 1 (Sangsawang 2016) of these 2 studies showed a statistically significant difference (in favour of the intervention group).

Consequently, for the outcome prepartum urinary incontinence, there is an indication of greater benefit of additional prepartum pelvic floor training in comparison with standard care alone, with moderate certainty of results.

4.5.2.2 Results on postpartum urinary incontinence

For the outcome postpartum urinary incontinence, only results for dichotomous outcomes were available. Three studies (Mørkved 2003, Reilly 2002 and Stafne 2012) reported the proportion of women with urinary incontinence 3 months after giving birth. The meta-analytical summary revealed a statistically significant difference in the pooled overall estimate (pooled odds ratio: 0.65 [95% CI: 0.43; 0.98]) in favour of women who had undergone additional prepartum pelvic floor training.

No results were reported for the recording of postpartum urinary incontinence as planned in Sobhgol 2022. However, as less than 70% of the women randomized were included in the analysis at 3 months after giving birth, these data would not have been usable in any case.

In an analysis conducted 6 months after giving birth, another study (Lekskulchai 2014) reported that the difference in the proportion of women with stress incontinence was not statistically significant. No further results were reported.

The long-term results for postpartum urinary incontinence at 7 years after childbirth (Stafne 2012) and 8 years after childbirth (Reilly 2002) were not usable, as fewer than 70% of the randomized women were included in both analyses. However, it remains unclear to what extent these long-term results can be usefully applied to an assessment of prepartum PFT. Rather, it can be assumed that subsequent pregnancies, for example, could have a much greater influence on such a long-term effect and thus overshadow any potential long-term effects of prepartum exercises performed during the first pregnancy.

Overall, based on the available results regarding postpartum urinary incontinence for the period after 3 months after childbirth there is an indication of a greater benefit of additional prepartum pelvic floor training in comparison with standard care alone, with a moderate certainty of results.

4.5.3 Results on faecal incontinence (pre- and postpartum)

In the included studies, although the outcome faecal incontinence was planned to be recorded in 2 studies (Sobhgol 2022 and Stafne 2012), neither pre- nor postpartum results were reported.

Consequently, for the outcomes pre- and postpartum faecal incontinence, there is no hint of greater benefit or harm of additional prepartum pelvic floor training in comparison with standard care alone.

4.5.4 Results on the burden of pelvic floor symptoms

For the outcome burden of pelvic floor symptoms, one study (He 2023) reported results at 6 weeks postpartum, which were recorded using the Pelvic Floor Distress Inventory – Short Form 20 (PFDI-20). The results for the 3 individual components (urinary incontinence, faecal incontinence and pelvic organ prolapse) were not reported separately, but instead only the total score of the PFDI-20. It remained unclear which location parameters (mean or median) and which measures of dispersion (minimum and maximum or 1st and 3rd quartiles) were used in the data presented. Furthermore, no information regarding group difference was reported. A calculation of these 2 values was not performed by the Institute, as this would have required several uncertain assumptions. Given the clear overlap in the reported intervals for each group, it can be assumed that there were no noteworthy differences between the groups.

Consequently, for the outcome burden of pelvic floor symptoms, there is no hint of greater benefit or harm of additional prepartum pelvic floor training in comparison with standard care alone.

4.5.5 Results on postpartum pain

In the included studies, no results were reported for the outcome postpartum pain, despite this having been planned in one study (He 2023).

Consequently, for the outcome postpartum pain, there is no hint of greater benefit or harm of additional prepartum pelvic floor training in comparison with standard care alone.

4.5.6 Results on sexual function (pre- and postpartum)

4.5.6.1 Results on prepartum sexual function

Results for the outcome prepartum sexual functioning were reported in one study (Sobhgol 2022). In GW 36, there was no statistically significant difference between the groups in either the total Female Sexual Function Index (FSFI) score or any of the subscales (e.g. pain during sexual intercourse).

Consequently, for the outcome prepartum sexual function, there is no hint of greater benefit or harm of additional prepartum pelvic floor training in comparison with standard care alone.

4.5.6.2 Results on postpartum sexual function

One study (Sobhgol 2022) provided usable findings regarding postpartum sexual functioning. At the 3-month postpartum timepoint, these showed no statistically significant difference between the study groups, either in terms of the total FSFI score or any of the subscales.

Consequently, for the outcome postpartum sexual function, there is no hint of greater benefit or harm of additional prepartum pelvic floor training in comparison with standard care alone.

4.5.7 Results on health-related quality of life (pre- and postpartum)

4.5.7.1 Results on prepartum health-related quality of life

The outcome prepartum health-related quality of life (HRQoL) was planned to be recorded in 4 of the included studies. One study (Jinapun 2024) demonstrated a statistically significant advantage of additional PFT in comparison with standard care alone, both for the total score of the Incontinence Impact Questionnaire – Short Form (IIQ-7) and for 5 of the 7 associated subscales. This included the impact of UI on the ability to carry out household chores, engage in physical recreation and entertaining activities, as well as on travel and social participation. In the subscales on UI-related impact on emotional health and feelings of frustration, the difference was smaller and was not statistically significant.

Despite the planned recording of HRQoL in Pelaez 2014 (using the King's Health Questionnaire [30]) and in Sobhgol 2022 (using the IIQ-7 [35]), no results were reported in either study. Furthermore, the Incontinence Impact Questionnaire (IIQ) data reported in Szumilewicz 2019 were unusable, as fewer than 70% of the randomized women were included in the analysis.

For the outcome QoL, the reported results for the IIQ-7 show a hint of a greater benefit of additional pelvic floor training in comparison with standard prepartum care alone, with moderate qualitative certainty of results.

4.5.7.2 Results on postpartum health-related quality of life

No usable results were reported in the included studies for the outcome postpartum health-related quality of life. The data on the Short Form 36 (SF-36) and the King's Health Questionnaire cited in Reilly 2002 were not included in this assessment, as fewer than 70% of the randomized women were included in the analyses or no usable data were reported. In another study (Sobhgol 2022), no relevant results were reported, despite the planned recording of IIQ-7. However, these results would not have been usable in any case, as the analysis at the 3-month postpartum timepoint included fewer than 70% of the randomized women.

Consequently, for the outcome postpartum HRQoL, there is no hint of greater benefit or harm of additional prepartum pelvic floor training in comparison with standard care alone.

4.5.8 Results on mode of birth

Delivery can take place either as a spontaneous birth, an operative vaginal delivery or a caesarean section. Thus, the different modes of birth are disjoint events which, taken together, account for 100% of all births. To estimate the possible risk of harm associated with the experimental intervention, one mode – the spontaneous births – was therefore used. The other modes are reported merely for descriptive purposes.

Four of the included studies reported relevant results regarding mode of birth as an outcome for the course of labour. The meta-analytical summary of these results showed no statistically significant difference (pooled odds ratio: 0.84 [95% CI: 0.59; 1.18]) between the groups in terms of the rate of spontaneous births.

Similarly, the reported proportions of operative vaginal deliveries requiring obstetric instruments (e.g. forceps or suction cup) were comparable across the 3 studies that reported these data: In the study groups that had undergone prepartum pelvic floor training, the proportion ranged from 16.7% to 25.8%. In the study groups receiving standard care alone, this proportion was between 0.2% and 2.9% higher than among women who had undergone pelvic floor training.

With regard to the number of caesarean sections, only 3 of the 4 studies provided a breakdown of the number of primary (i.e. planned) caesarean sections as opposed to the number of secondary or emergency caesarean sections. As the decision to perform a primary caesarean section is elective and at least sometimes made without medical justification, the available data on caesarean section rates could not be meaningfully interpreted. Rather, they compromise the assessment of the other results relating to the mode of birth outcome; it is fundamentally conceivable that concerns about PFT-related birth complications may have led more participants in the intervention group to opt for a primary caesarean section at an early stage. On the other hand, it also seems possible that primary caesarean sections may have helped to prevent subsequent complications in delivery requiring the use of obstetric instruments or an emergency caesarean section.

Overall, for mode of birth as an outcome on the course of labour, there is no hint of greater benefit, but also no hint of greater harm, of additional prepartum pelvic floor training in comparison with standard care alone.

4.5.9 Results on perineal injuries

To assess the outcome of perineal injuries, the results relating to 3rd- and 4th-degree perineal tears were primarily used. The background to this was that these higher-grade perineal tears

can result in serious and sometimes permanent complications (e.g. permanent faecal incontinence or rectovaginal fistulae) due to injuries to the anal sphincter and possibly the rectal wall (in the case of 4th-degree perineal tears). Furthermore, it seems obvious that the number of first- and second-degree perineal tears was influenced by episiotomies, and that the results therefore cannot be interpreted meaningfully.

The meta-analytical summary of the results from 3 studies (He 2023, Reilly 2002 and Sobhgol 2022) on higher-degree perineal tears (3rd and 4th degree) showed no statistically significant difference (pooled odds ratio: 0.43 [95% CI: 0.11; 1.69]) between the groups.

The results on episiotomies were not used for this assessment. On the one hand, the decision to conduct an episiotomy depends largely on the hospital's internal standards and, sometimes, on the individual preferences and qualifications of the health care professionals involved. On the other hand, the studies did not provide any information on how the episiotomies were conducted (incision technique, depth, etc.) or on possible long-term complications. Consequently, the results regarding the number of episiotomies performed could not be interpreted meaningfully.

Overall, the results on higher-grade perineal tears for perineal injuries as an outcome on the course of labour show neither a hint of greater benefit nor a hint of greater harm of additional prepartum pelvic floor training in comparison with standard care alone.

4.5.10 Results on preterm birth and premature rupture of the membranes

4.5.10.1 Results on preterm birth

The He 2023 study reported an event rate of 2.1% for the outcome preterm birth (without further definition) in both study groups and, with an insufficient data scenario, no statistically significant group difference (odds ratio: 1.00 [95% CI: 0.06; 16.46]).

Therefore, for preterm birth as an outcome on the course of labour, there is no hint of greater benefit, but also no hint of greater harm, of additional prepartum pelvic floor training in comparison with standard care alone.

4.5.10.2 Results on premature rupture of the membranes

For the outcome of preterm rupture of the membranes (without further definition), He 2023 also reported a numerical but not statistically significant group difference (odds ratio: 1.33 [95% CI: 0.56; 3.14]).

Therefore, for premature rupture of the membranes as an outcome on the course of labour, there is no hint of greater benefit, but also no hint of greater harm, of additional prepartum pelvic floor training in comparison with standard care alone.

4.5.11 Results on (serious) adverse events

With regard to potential side effects, only very brief verbal descriptions were found in a few of the included studies. The authors reported that no adverse events (Mørkved 2003 and Sangsawang 2016) or even serious adverse events (Stafne 2012) had occurred in the intervention group or in relation to pelvic floor training. No further information on specific (S)AEs was reported. It appears that none of the studies carried out a systematic recording of AEs, but at most a recording of specific (S)AEs.

4.6 Summarized assessment of the results

Evidence map

The following Table 4 shows the evidence map regarding patient-relevant outcomes.

Table 4: Evidence map regarding patient-relevant outcomes

	Mortality	**Morbidity**					**QoL**	**Course of labour**			**Side effects**
	All-cause mortality	Pre- and postpartum urinary incontinence	Pre- and postpartum faecal incontinence	Burden of pelvic floor symptoms	Postpartum pain	Sexual functioning (pre-/postpartum)	QoL (pre-/postpartum)	Birth mode	Perineal injuries	Preterm birth / premature rupture of the membranes	(Serious) adverse events
Prepartum PFT with standard care vs. standard care alone	–	⇑ / ⇑[a]	– / –	⇔	–	⇔ / ⇔	⇗ / –	⇔[b]	⇔[c]	(⇔) / ⇔	⇔[d]

⇑: Indication of a (greater) benefit or indication of a lesser harm
⇗: Hint of a (greater) benefit or indication of a lesser harm
⇔: no hint, indication or proof, homogeneous result
(⇔): no hint, indication or proof; the 95% confidence interval for the relative effect is so imprecise that neither halving nor doubling of the effect can be ruled out
–: No (usable) data reported
a. The indication of a greater benefit of additional PFT is based on results for the timepoint 3 months after childbirth. Due to missing data, it is not possible to draw any conclusions regarding the greater benefit or harm of the additional PFT in the longer-term.
b. Proportion of spontaneous births.
c. 3rd- and 4th-degree perineal tears.
d. It was only reported that no (serious) adverse events related to the PFT occurred.

PFT: pelvic floor training; QoL: quality of life

Assessment of the volume of unpublished data

For the assessment, 2 relevant trial registry entries with a total of 145 randomized women were available (see Section A3.1.4 of the full report), whose status was declared as completed by the trial investigators and for which no results were identified. When compared with the total number of recruited women in the study pool (2491 in total), the proportion of unpublished data at study level – at 5.5% – was so low that the data could be considered sufficiently complete and publication bias unlikely.

With regard to data completeness at outcome level, a different picture emerged, particularly for the outcome of prepartum urinary incontinence. Only 1 [45] of the 2 completed studies with no reported results, involving a total of 70 study participants, recorded prepartum urinary incontinence as an outcome. However, as the included study Sobhgol 2022 [36], which involved a total of 202 randomized women, did not report any results regarding the planned recording of urinary incontinence and prepartum QoL [35], the proportion of unpublished data for the outcome of prepartum urinary incontinence was 16.4% (based on the dichotomous operationalization). However, the missing results from Sobhgol 2022 were not relevant for postpartum urinary incontinence: As the analysis at 3 months postpartum included only 55% of the randomized women, these results would not have been used in this assessment in any case.

Furthermore, with regard to prepartum QoL – in addition to the missing data from Sobhgol 2022 – no results could be identified for the Pelaez 2014 study (N = 169), meaning that there were unpublished data for a total of 71.2% of women for whom this outcome had been recorded.

When the potential consequences of such outcome reporting bias were investigated, it became apparent that, in the case of prepartum urinary incontinence, the available results could be rated as very robust; assuming a zero effect (i.e. an odds ratio of 1) in the unreported results, the statistically significant overall estimator from the meta-analytical summary (see Section A3.3.3.1 of the full report) remains valid. The unpublished data were therefore unlikely to have had any impact on the evidence base for the outcome of prepartum urinary incontinence. For prepartum QoL, the certainty of conclusions was downgraded due to the unreported results from the Pelaez 2014 and Sobhgol 2022 studies and the associated outcome reporting bias. Consequently, a hint of a greater benefit of PFT is no longer derived for this outcome.

Weighing up the benefits and harms

Based on the available study data, the outcomes for the prevention of urinary incontinence each showed a statistically significant advantage of the experimental intervention both towards the end of pregnancy and in the first 3 months postpartum, i.e. in the period up to a

possible postnatal exercise class with renewed PFT. There is therefore an indication of a greater benefit of additional PFT in comparison with standard care alone, both for prepartum and postpartum urinary incontinence. Other outcomes showed no statistically significant advantage. The outcome-specific certainty of conclusions for prepartum QoL had to be downgraded due to the likely outcome reporting bias; consequently, an outcome-specific benefit could no longer be derived.

The demonstrated benefits in terms of preventing urinary incontinence were not associated with any increased risk of harm; neither the reported information on intervention-specific side effects nor the results of the outcomes relating to the course of labour (such as perineal injuries) or other outcomes (e.g. sexual function) suggest any adverse effects of additional PFT. It did appear that the included studies did not systematically record any potential SAEs. However, given the mechanism of action of PFT, intervention-specific SAEs were not to be expected either. Minor discomfort, such as muscle soreness or tension in the pelvic floor muscles caused by overly intense training, would not diminish the advantages outlined with regard to urinary incontinence.

Taking all the results together, an indication of a greater benefit of additional PFT in comparison with standard care alone was derived.

5 Classification of the assessment result

When interpreting the findings of this report, several aspects and methodological details of the included studies must be taken into account:

The conclusion regarding the benefit was based primarily on studies involving first-time mothers with a singleton pregnancy. Admittedly, in 3 (Stafne 2012, Szumilewicz 2019 and Zhang 2025) of the 11 included studies, recruitment was not explicitly restricted to first-time mothers. None of the studies reported specific results for this subgroup. Furthermore, it was not possible to quantify the proportion of these women in the overall data. One reason for this was that only 2 (Stafne 2012 and Zhang 2025) of the 3 studies reported the proportion of women who had previously given birth. Furthermore, the data in Zhang 2025 regarding the proportion of these women was limited exclusively to that part of the study population which had been followed up until the end of the study. With regard to the results for the respective total study populations, these 2 studies on the outcomes of prepartum urinary incontinence (see Figure 2 of the full report) and postpartum urinary incontinence (Stafne 2012 only, see Figure 4 of the full report) showed the least pronounced effects (Zhang 2025) or no statistically significant difference between the study groups (Stafne 2012). However, this did not allow any conclusions to be drawn as to what the specific effect might have been for the subgroup of women who had previously given birth. As previous deliveries can also increase the risk of subsequent pelvic floor symptoms (see Chapter 1), the conclusion on benefit shown here cannot be transferred to the effect of PFT in subsequent pregnancies without specific evidence. The same applies to women with multiple pregnancies: only one (Reilly 2002) of the included studies was not explicitly restricted to women with singleton pregnancies. However, it remained unclear whether, and to what extent, women with multiple pregnancies were actually included in this study. Since it can be assumed that the weight and size of the foetuses in multiple pregnancies is higher than in singleton pregnancies, it stands to reason that the risk of pregnancy-related pelvic floor symptoms is also increased in this subgroup; consequently, the available evidence does not allow the current conclusion on the benefit to be transferred to women with multiple pregnancies.

Furthermore, differences in the assessment of the research question are evident across the studies, which may have influenced the study effects: For example, in 6 of the included studies, the instructions or PFT lesson at the beginning involved (mostly vaginal-palpatory) testing of the pelvic floor muscles to ensure that they were contracting with sufficient strength and symmetry. It was not possible to assess, on the basis of the available results, to what extent the lack of testing in the other studies may have led to smaller training effects. From the results of studies that explicitly did not conduct any contraction testing (Pelaez 2014 and Zhang 2025) it could not be seen that the effect on prepartum urinary incontinence was any less pronounced.

Nor did the available studies provide any information for the derivation of potential effect modifiers in relation to the design of the PFT. For example, with regard to the outcome of prepartum urinary incontinence, almost all studies with relevant results showed a statistically significant advantage in favour of the experimental intervention – regardless of when during pregnancy PFT began or whether the training was carried out, for example, over 6 weeks with ≥ 5 sessions per week (Sangsawang 2016) or over approximately 30 weeks with 3 sessions per week (Zhang 2025). In order to reliably assess different forms of training, more comprehensive information on how the training was conducted (e.g. the actual duration of training for all study participants) and a direct comparison of different settings (e.g. individual versus group training or with or without qualified training instruction) would be necessary. The necessary information could not be derived from the studies included.

Furthermore, in several studies, women in both the test and control groups were given general information on the importance of PFT and recommendations on how to perform it. In one of the studies (Mørkved 2003), participants in both study arms even underwent individual PFT instruction. This is likely to have provided additional motivation for at least some of the women in the control group to perform independent PFT as well. For example, in Reilly 2002 it was reported that over 51% of women in the control group had also regularly been performing PFT. It was not possible to assess the extent to which this influenced the group differences in the outcomes investigated and, as a result, led to an underestimation of the effects.

Informative information on adherence – that is, active participation in maintaining the prescribed PFT method and frequency – was found in only some studies. Whilst, for example, Pelaez 2014 reported that all women in the test group had performed at least 80% of all training sessions, in Sobhgol 2022 only 50% of the women in the test group adhered to the specifications. The extent to which varying participation rates might affect outcomes relevant to the assessment was investigated for only one of the study populations: Reilly 2022 reported that 18.2% of women who had performed and documented the specified PFT on at least 28 days between GW 20 and delivery (46% of the test group) exhibited postpartum stress incontinence. In contrast, among the 11% of women with a documented PFT between 0 and 28 days, the rate of postpartum stress incontinence was much higher, at 38.5%. However, the remaining 43% of the test group who did not have any documented training sessions showed a similar rate of urinary incontinence (15.4%) to that of the women with high compliance (18.2%).

6 Conclusion

Based on the available evidence, first-time mothers with singleton pregnancies who conduct prepartum pelvic floor training are less likely to experience urinary incontinence both during pregnancy and in the first weeks after delivery than women who do not undergo such training. There is therefore an indication of a greater benefit of additional pelvic floor training in comparison with standard care alone, both for the prevention of prepartum urinary incontinence and for the prevention of postpartum urinary incontinence up to 3 months after delivery. The reported advantages of pelvic floor training in terms of prepartum health-related quality of life are clearly impaired by unpublished results. Consequently, following the downgrading of the certainty of conclusions, no conclusion regarding the benefit could be derived for this outcome.

For other outcomes, such as pre- and postpartum faecal incontinence, postpartum pain or sexual function, there was no benefit or harm of pelvic floor training based on the available study data. This was partly due to a lack of differences between the comparator groups, and partly to a lack of study results which were not reported, although their recording had been planned.

No potential side effects of pelvic floor training were reported in the included studies. Given the mode of action of pelvic floor training, serious adverse events in particular were not to be expected either. Consequently, the results relating to the course of labour were also taken into account when interpreting the risk of harm associated with pelvic floor training; these results showed no adverse effect to the disadvantage of pelvic floor training in comparison with standard care alone for the mode of birth based on spontaneous births, higher-grade perineal tears, preterm births and premature rupture of membranes.

Taking all the results together, there is an indication of a greater benefit of additional pelvic floor training for first-time mothers with singleton pregnancies in comparison with standard care alone.

7 References for English extract

Please see full final report for full reference list.

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The full report (German version) is published under
https://www.iqwig.de/en/projects/n25-04.html

Appendix A Search strategies

A.1 Searches in bibliographic databases

Search for systematic reviews

1. MEDLINE

Search interface: Ovid

- Ovid MEDLINE(R) ALL 1946 to March 27, 2025

The following filter was adopted:

- Systematic review: Wong [46] – High specificity strategy (adaptiert)

#	Searches
1	exp Pregnancy/
2	(pregnan* or prenatal or antenatal).ti,ab.
3	or/1-2
4	Pelvic Floor/
5	(pelvic adj1 floor adj3 (training* or exercise*)).ti,ab.
6	or/4-5
7	and/3,6
8	Cochrane database of systematic reviews.jn.
9	(search or MEDLINE or systematic review).tw.
10	(meta analysis or systematic review).pt.
11	or/8-10
12	11 not (exp animals/ not humans.sh.)
13	and/7,12
14	13 and (english or german or multilingual or undetermined).lg.
15	..l/ 14 yr=2020-Current

2. International HTA Database

Search interface: INAHTA

#	Searches
1	"Pregnancy"[mhe]
2	(pregnan* OR prenatal OR antenatal)[Title] OR (pregnan* OR prenatal OR antenatal)[abs]
3	#2 OR #1
4	"Pelvic Floor"[mh]
5	(pelvic AND floor AND (training* OR exercise*))[Title] OR (pelvic AND floor AND (training* OR exercise*))[abs]
6	#5 OR #4

#	Searches
7	#6 AND #3
8	(*) FROM 2020 TO 2025
9	#8 AND #7

Search for primary studies

1. MEDLINE

Search interface: Ovid

- Ovid MEDLINE(R) 1946 to May 19, 2025

The following filter was adopted:

- RCT: Lefebvre [47] – Cochrane Highly Sensitive Search Strategy for identifying randomized trials in MEDLINE: sensitivity-maximizing version (2023 revision)

#	Searches
1	Pregnancy/
2	(pregnan* or antenatal* or prenatal*).ti,ab.
3	or/1-2
4	Pelvic Floor/
5	(*Exercise/ or *Exercise Therapy/) and (physiology or prevention & control or psychology).fx.
6	(pelvic adj3 (training* or exercise*)).ti,ab.
7	or/4-6
8	and/3,7
9	exp Randomized controlled Trial/
10	controlled clinical trial.pt.
11	(randomized or placebo or randomly or trial or groups).ab.
12	drug therapy.fs.
13	or/9-12
14	13 not (exp animals/ not humans.sh.)
15	and/8,14
16	(animals/ not humans/) or comment/ or editorial/ or exp review/ or meta analysis/ or consensus/ or exp guideline/
17	hi.fs. or case report.mp.
18	or/16-17
19	15 not 18
20	19 and (english or german or multilingual or undetermined).lg.
21	remove duplicates from 20

2. Embase

Search interface: Ovid

- Embase 1974 to 2025 May 19

The following filter was adopted:

- RCT: Wong [46] – Strategy minimizing difference between sensitivity and specificity

#	Searches
1	pregnancy/
2	pregnant woman/
3	(pregnan* or antenatal* or prenatal*).ti,ab.
4	or/1-3
5	pelvic floor muscle training/
6	pelvic floor/
7	(pelvic adj3 (training* or exercise*)).ti,ab.
8	or/5-7
9	and/4,8
10	(random* or double-blind*).tw.
11	placebo*.mp.
12	or/10-11
13	and/9,12
14	13 not medline.cr.
15	14 not (exp animal/ not exp human/)
16	15 not (Conference Abstract or Conference Review or Editorial).pt.
17	16 not ((afrikaans or albanian or arabic or armenian or azerbaijani or basque or belorussian or bosnian or bulgarian or catalan or chinese or croatian or czech or danish or dutch or english or esperanto or estonian or finnish or french or gallegan or georgian or german or greek or hebrew or hindi or hungarian or icelandic or indonesian or irish gaelic or italian or japanese or korean or latvian or lithuanian or macedonian or malay or norwegian or persian or polish or polyglot or portuguese or pushto or romanian or russian or scottish gaelic or serbian or slovak or slovene or spanish or swedish or thai or turkish or ukrainian or urdu or uzbek or vietnamese) not (english or german)).lg.
18	remove duplicates from 17

3. The Cochrane Library

Search interface: Wiley

- Cochrane Central Register of Controlled Trials: Issue 4 of 12, April 2025

#	Searches
#1	[mh ^Pregnancy]
#2	(pregnan*:ti,ab OR antenatal*:ti,ab OR prenatal*:ti,ab)

#	Searches
#3	#1 OR #2
#4	[mh ^"Pelvic Floor"]
#5	[mh ^"Exercise Therapy"]
#6	[mh ^Exercise]
#7	(pelvic:ti,ab NEAR/3 (training*:ti,ab OR exercise*:ti,ab))
#8	#4 OR #5 OR #7
#9	#3 AND #8
#10	#9 not (*clinicaltrial*gov* or *trialsearch*who* or *clinicaltrialsregister*eu* or *anzctr*org*au* or *trialregister*nl* or *irct*ir* or *isrctn* or *controlled*trials*com* or *drks*de*):so
#11	#10 not ((language next (afr or ara or aze or bos or bul or car or cat or chi or cze or dan or dut or es or est or fin or fre or gre or heb or hrv or hun or ice or ira or ita or jpn or ko or kor or lit or nor or peo or per or pol or por or pt or rom or rum or rus or slo or slv or spa or srp or swe or tha or tur or ukr or urd or uzb)) not (language near/2 (en or eng or english or ger or german or mul or unknown)))
#12	#11 in Trials

4. Cinahl

Search interface: Ebsco

#	Searches
1	MH "Pregnancy"
2	XB (pregnan* or antenatal* or prenatal*)
3	S1 OR S2
4	MH "Pelvic Floor Muscles"
5	MM "Exercise"
6	XB (pelvic N3 (training* or exercise*))
7	S4 OR S5 OR S6
8	S3 AND S7
9	MH "Treatment Outcomes+" OR experimental studies OR XB random* OR MW random*
10	S8 AND S9
11	S10 AND LA (english OR german)

A.2 Searches in study registries

1. ClinicalTrials.gov

Provider: U.S. National Institutes of Health

- URL: http://www.clinicaltrials.gov
- Type of search: Expert Search

Search strategy
(AREA[ConditionSearch](Pregnancy OR antenatal OR prenatal) AND AREA[InterventionSearch](pelvic training OR pelvic exercise) OR AREA[BriefTitle](Pregnancy AND (exercise OR training)) OR AREA[OfficialTitle](Pregnancy AND (exercise OR training))) AND AREA[Phase](NA OR Phase2 OR Phase3 OR Phase4)

2. International Clinical Trials Registry Platform Search Portal

Provider: World Health Organization

- URL: https://trialsearch.who.int
- Type of search: Standard Search / Advanced Search

Search strategy
(pregnan* OR antenatal OR prenatal) AND (pelvi* AND (training OR exercise)) [Standard Search]
(pregnancy AND (exercise OR training)) [Title] [Advanced search]
"pelvic floor muscle training"[Title] [Advanced search]