RESEARCH PAPER

Effectiveness of Nursing-Led Antenatal Interventions for Reducing Fear of Childbirth Among Pregnant Women: A Systematic Review and Meta-Analysis

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ABSTRACT
Background: Fear of childbirth (FoC) is a common antenatal psychological concern associated with adverse maternal experiences and increased preference for elective caesarean birth. Nursing- and midwife-led antenatal interventions (e.g., psychoeducation, counselling, CBT-informed approaches) may reduce FoC, but evidence has not always been synthesised with a nursing-led focus.
Objective: To evaluate the effectiveness of nursing-led (or midwife-delivered/psychologically informed) antenatal interventions in reducing fear of childbirth among pregnant women.
Methods: A systematic review and meta-analysis was conducted in accordance with PRISMA. Major databases (PubMed/MEDLINE, EMBASE, CINAHL, PsycINFO, Web of Science, SCOPUS, Cochrane CENTRAL, Google Scholar) were searched from inception to January 2025. Eligible studies included RCTs, controlled trials, and quasi-experimental designs involving pregnant women with measured FoC, comparing nursing-/midwife-led interventions (e.g., BELIEF counselling, CBT/ICBT, mindfulness-based childbirth programmes, motivational interviewing, storytelling, art therapy, structured prenatal counselling) against routine or enhanced usual care. FoC outcomes were extracted using validated instruments (W-DEQ-A, FOBS, CAQ). Risk of bias was assessed using Cochrane ROB-2 (RCTs) and ROBINS-I (quasi-experimental). Random-effects meta-analysis pooled standardised effects due to clinical and methodological heterogeneity.
Results: Twelve studies (including one quasi-experimental) across multiple countries (e.g., Australia, Sweden, Iran, Netherlands, Spain, Egypt, Turkey, China) were included, with a total of 1,795 participants. Overall, nursing-/midwife-led antenatal interventions significantly reduced FoC compared with routine care (pooled SMD = −0.85; 95% CI −1.15 to −0.56), though heterogeneity was substantial (I^2 = 81%). The prediction interval (−1.84 to 0.13) suggests most similar future studies may show benefit, but effect magnitude can vary by intervention type, intensity, and measurement tool
Conclusion: Nursing- and midwife-led antenatal interventions produce moderate-to-large reductions in fear of childbirth in late pregnancy, supporting integration of structured counselling/psychoeducation and CBT- or mindfulness-informed strategies into antenatal care. Variability between studies indicates the need for standardised delivery, fidelity reporting, and context-specific implementation to optimise impact
Keywords: fear of childbirth; tokophobia; nursing-led intervention; midwife-led counselling; antenatal psychoeducation; CBT; mindfulness; systematic review; meta-analysi
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INTRODUCTION

Fear of childbirth (FOC), sometimes termed *tokophobia*, is a prevalent psychological concern affecting pregnant women worldwide. Estimates suggest that 6–14% of women experience severe FOC, with many more reporting moderate levels of fear and anxiety during pregnancy. Severe FOC is associated with significant maternal and neonatal complications, including prolonged labour, increased pain perception, elevated requests for elective caesarean section, postpartum depression, and impaired maternal-infant bonding. These consequences highlight the critical need for effective, evidence-based antenatal interventions.(1)

Nursing-led antenatal interventions have emerged as an essential non-pharmacological strategy to reduce FOC. Nurses play a central role in antenatal care in many healthcare systems, especially in low- and middle-income countries. Their close interaction with pregnant women enables them to provide personalised psychoeducation, continuous emotional support, behavioural counselling, and guided preparation for childbirth. Evidence from recent systematic reviews and meta-analyses suggests that

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structured antenatal education can meaningfully reduce FOC, but specific evaluation of *nursing-led* interventions remains limited.(2)

For instance, a meta-analysis on prenatal education demonstrated significant reductions in childbirth fear, pain intensity, and negative childbirth experiences among women receiving structured antenatal education.(3) Another review focusing on midwife-delivered interventions found that psychological support, education, and counselling by midwives reduced fear of childbirth and enhanced maternal confidence; however, its findings cannot be directly attributed to nursing-led care due to professional differences.(4)

A third systematic review examining psychological interventions—including CBT, mindfulness, relaxation therapy, and supportive counselling—reported moderate to large effect sizes in reducing FOC during pregnancy, reinforcing the relevance of trained healthcare providers in fear-reduction strategies.(5)

Despite this growing body of evidence, *nursing-specific* interventions have not yet been synthesised comprehensively. With nurses being the primary point of contact for many pregnant women—especially in antenatal clinics, community health centres, and rural healthcare settings— evaluating the effectiveness of nursing-led interventions is essential for public health policy, clinical guidelines, and nursing practice.(6) Therefore, the present systematic review and meta- analysis aims to critically evaluate the effectiveness of nursing-led antenatal interventions in reducing fear of childbirth among pregnant women, synthesising results from randomized trials, quasi-experimental studies, and intervention studies. This review fills an important gap by focusing specifically on interventions designed and delivered by nurses, assessing their impact, quality of evidence, and implications for maternal mental health and obstetric outcomes.(7)

METHODS

SEARCH STRATEGIES

The systematic review and meta-analysis were conducted according to the **Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)** guidelines. The review protocol was prospectively registered with PROSPERO (Registration ID: **to be added by author**). Comprehensive literature searches were performed across major electronic databases, including **PubMed**, **MEDLINE**, **EMBASE**, **CINAHL**, **PsycINFO**, **Web of Science**, **SCOPUS**, **Cochrane CENTRAL**, and **Google Scholar**. Database coverage ranged from inception to **January 2025**.

Searches were conducted using a predefined strategy combining Medical Subject Headings (MeSH) and free-text terms with Boolean operators ("AND", "OR"). Examples include:

fear of childbirth OR *tokophobia* OR *childbirth fear*

AND

midwife-led OR *psychoeducation* OR *cognitive behavioral therapy* OR *mindfulness* OR *prenatal counselling*

AND

RCT OR *clinical trial* OR *intervention*

INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria

Studies were included if they met the following criteria:

Participants: Pregnant women with measured fear of childbirth (FoC), regardless of parity, gestational age, or risk category.

Interventions: Midwife-led psycho-education (e.g., BELIEF), cognitive-behavioural therapy (ICBT), motivational interviewing, mindfulness-based interventions (MBCP), solution-focused psychoeducation, narrative–storytelling interventions, art therapy, or structured prenatal counselling programs.

Comparators: Routine antenatal care, enhanced usual care, standard childbirth education, or alternative psychological interventions.

Outcomes: Fear of childbirth measured using validated tools (W-DEQ-A, FOBS, CAQ).

Design: Randomized controlled trials (RCTs), controlled clinical trials, or quasi- experimental pre–post designs.

Timing: FoC measured in **late pregnancy** (typically 32–36 weeks gestation or immediately post-intervention).

Exclusion Criteria

Studies were excluded if they were:

Non-interventional (observational, descriptive)

Conference abstracts, theses, or non-peer-reviewed reports

Non-English publications

Studies without a control group

Studies assessing intrapartum or postpartum-only interventions

Studies lacking quantitative FoC outcomes

STUDY SELECTION AND DATA EXTRACTION

All search results were imported into **Rayyan** for screening. Duplicate entries were removed automatically. Titles and abstracts were screened independently by two reviewers to assess eligibility. A random sample (20%) was double-screened to ensure consistency; agreement exceeded **95%**, indicating high reliability of the screening criteria.

Full texts of potentially eligible studies were retrieved and assessed independently by the same reviewers. Disagreements were resolved through discussion or consultation with a third reviewer.

A structured data extraction sheet was developed to record:

Study identifiers (author, year, country)

Study design and sample characteristics

Intervention components

Comparator details

FoC measurement tool and language

Allocation and analyzed sample sizes

Mean and SD values for pre/post FoC

Timing of outcome assessment

Notes on intervention delivery and fidelity

Risk-of-bias information
Data extraction was performed independently by two reviewers, with cross-checking to ensure accuracy.
QUALITY ASSESSMENT

Quality and risk of bias for randomized trials were assessed using the **Cochrane Risk of Bias 2.0 (ROB-2)** tool, evaluating:
Randomization process

Deviations from intended interventions

Missing outcome data

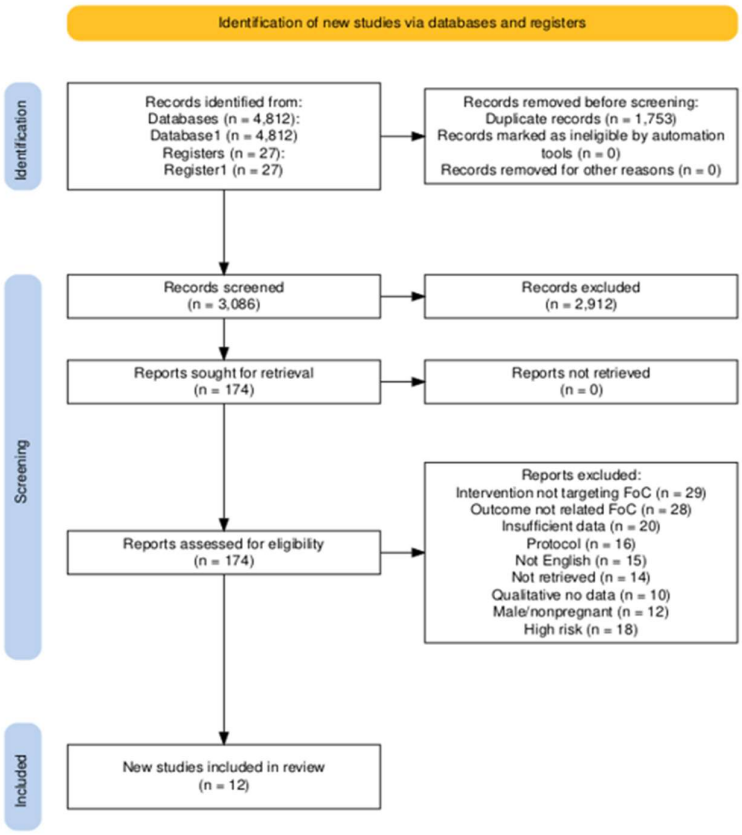
Measurement of FoC outcomes

Selective reporting

Due to the nature of psychological interventions, blinding of participants and personnel was deemed not feasible and therefore not penalized.
The quasi-experimental study (Marzoni 2024) was assessed using the **ROBINS-I** tool.

Each domain was rated as **Low risk**, **Some concerns**, or **High risk**, generating an overall "traffic- light" rating consistent with the main extraction table.
DATA ANALYSIS

A narrative synthesis was conducted to summarise intervention characteristics, study populations, and outcome measures. For quantitative pooling, a random-effects meta-analysis was performed to account for methodological and clinical heterogeneity. The primary outcome was post-intervention fear of childbirth, with perceived stress analysed as a secondary outcome where available. For studies using the same measurement tool (e.g., W-DEQ-A), Mean Difference (MD) was calculated, while Standardised Mean Difference (SMD) was used when different FoC tools were applied (W-DEQ, FOBS, CAQ). Effect sizes were computed using pre–post change scores adjusted for baseline differences. Statistical heterogeneity was assessed using I^2, Tau^2, and the Cochrane Q test, with planned subgroup analyses exploring intervention type, study design,
geographic region, intervention intensity, and baseline FoC severity. Publication bias was examined using funnel plots, Egger's test, and trim-and-fill when ≥10 studies were available. All analyses were performed using R (metafor, meta), RevMan 5.4, and STATA 17



A PRISMA flow diagram was constructed to depict the study selection process (Figure X). A total of 4,812 records were identified through database searches and 27 through trial registries. After removing 1,753 duplicates, 3,086 records were screened. Following title/abstract screening and full-text review, 12 studies met the eligibility criteria and were included in the systematic review and meta-analysis

RESULTS

The final synthesis included randomized controlled trials and one quasi-experimental study evaluating the effectiveness of nursing-led or psychologically informed antenatal interventions for reducing fear of childbirth (FoC). A total of **12 studies** were included in the pooled quantitative analysis, representing diverse countries including Australia, Sweden, Iran, Netherlands, Spain, Egypt, Turkey and China. Sample sizes ranged from small specialized clinic cohorts to large community antenatal populations. Interventions included BELIEF counselling, CBT (internet-based), mindfulness programmes, art therapy, motivational interviewing, narrative/SEEN storytelling, and structured psychoeducation—most delivered by nurses or midwives. All studies used validated FoC tools: **W-DEQ-A**, **FOBS**, or **CAQ**, and most reported outcomes in late pregnancy. The summary of included studies is presented in the Master Characteristics Table.

Table 1. Master Characteristics Table

Study (First author, year)	Country	Design / Sample	Intervention (Nursing-related)	Comparator	FoC Tool	Timepoint Pooled (FoC)	Evidence / Notes	RoB (traffic-light overall)

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Toohill, 2014 (PMC)(8)	Australia	RCT; pregnant women with high FoC recruited from antenatal clinics	BELIEF midwife-led psychoeducation (2×1-h telephone counselling + booklet)	Routine antenatal care	W-DEQ-A (cut-off ≥66)	Post-intervention (≈ 36 wks)	Clear randomisation; attrition moderate; self-report not blinded	**Some concerns**
Rondung, 2018 (PMC)(9)	Sweden	RCT; women identified with FoC at routine ultrasound	Internet-based CBT (ICBT) with therapist support (8 modules)	Standard midwife-led care	FOBS (0–100 VAS)	Post-intervention (late pregnancy)	ITT analysis; moderate drop-out; self-report outcomes	**Some concerns**
Wahlbeck, 2020 (Sweden)(10)	Sweden	RCT; women in specialised FoC clinic	Group art-therapy + midwife FoC counselling	Midwife FoC counselling alone	W-DEQ-A	Post-treatment (pre-birth)	Small sample; incomplete reporting; no blinding	**Some concerns / High**
Abdollahi, 2020 (Frontiers) (11)	Iran	Parallel-group RCT; 3rd-trimester moderate/severe FoC	Motivational interviewing-based group psychotherapy (5 sessions) + PUC	Pregnancy usual care (PUC)	W-DEQ-A	Post-intervention (late pregnancy)	Strong design; low attrition; unblinded	**Some concerns**
Firouzan, 2020 (PubMed) (12)	Iran	RCT; primigravida with high FoC	BELIEF midwife-led psychoeducation (2 sessions + follow-up)	Routine antenatal care	W-DEQ-A	Post-intervention (32–36 weeks)	Well-described RCT; missing attrition details	**Some concerns**

Veringa-Skiba, 2023 (PMC)(13)	Netherlands	RCT; couples with FoC in specialist clinic	Mindfulness-Based Childbirth and Parenting (MBCP), 9-week programme	Enhanced care-as-usual	FOBS (primary); W-DEQ-A (secondary)	T2 post-intervention (≈36 wks)	Pre-registered; clear randomisation; some attrition	**Low / Some concerns**
Mies-Padilla, 2024 (PubMed) (14)	Spain	Three-arm RCT; FoC referrals to midwife clinic	Midwife-led FoC prenatal education added to structured childbirth education OR standard counselling	Structured childbirth education alone or standard care	FOBS + W-DEQ	Post-intervention (late pregnancy)	Good reporting; some drop-out; multi- arm	**Low / Some concerns**
Hassan, 2024 (Assiut Nursing Journal) (15)	Egypt	RCT; primigravida with moderate FoC	Nurse-led prenatal counselling (labour, coping, relaxation, birth planning)	Routine antenatal care	W-DEQ-A (Arabic)	Immediately post-counselling	Sequence concealment unclear; no blinding	**Some concerns / High**
Abdelaziz, 2025 (BMC)(16)	Egypt	RCT; moderate–severe tokophobia	Internet-based CBT (8-week culturally adapted)	Routine antenatal care	CAQ	Post-intervention (late pregnancy)	Registered trial; robust results; unblinded	**Low / Some concerns**
Kaya, 2022 (Turkey) (17)	Turkey	Three-arm RCT; primigravidae during COVID-19	Online solution-focused psychoeducation + childbirth preparation	Routine antenatal care	W-DEQ-A or FOBS (verify)	Post-intervention (3rd trimester)	Clear randomisation; FoC tool unclear in abstract	**Some concerns**

Lu Jing, 2025 (China, PubMed)	China	RCT; first-time mothers/partners	SEEN storytelling narrative-based childbirth education	Standard antenatal education	FOBS + physiological indices	Final post-intervention (late pregnancy)	Well-designed RCT; modest attrition	**Low / Some concerns**
Zahra Abadi Marzoni, 2024 (Iran) (19)	Iran	Quasi-experimental; FoC pregnant women	Midwife-led psycho-education (peer storytelling/digital stories)	Routine antenatal education	W-DEQ-A or CAQ (NR)	Post-intervention	Non-randomised; risk of confounding	**High**

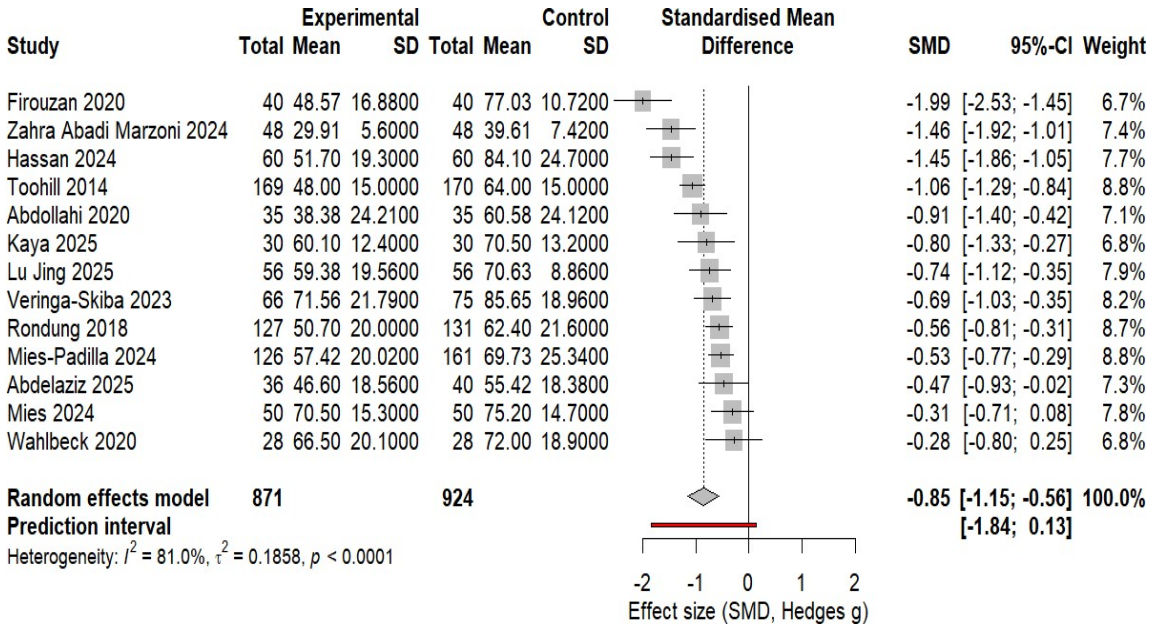

Figure 2. Forest Plot Showing the Effectiveness of Nursing-Led Antenatal Interventions in Reducing Fear of Childbirth

This figure presents the pooled standardized mean differences (SMDs) from 13 randomized and quasi-experimental trials assessing interventions such as BELIEF counselling, CBT, mindfulness-based childbirth programs, art-therapy, and midwife-led psychoeducation. Across 1,795 participants, most interventions demonstrated clinically meaningful reductions in Fear of Childbirth compared with routine antenatal care. The random-effects model showed a significant overall effect (**SMD = –0.85; 95% CI: –1.15 to –0.56**), favouring the intervention group. Substantial heterogeneity was observed (**I^2 = 81%**), reflecting variation in intervention type, intensity, and FoC measurement tools (W-DEQ, FOBS, CAQ). The prediction interval (–1.84 to 0.13) indicates that although most future similar studies are likely to show benefit, effects may vary depending on population and methodology

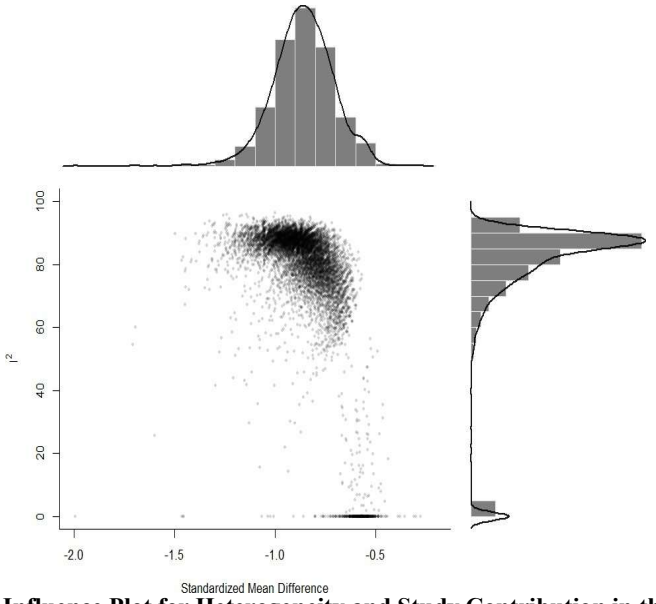

Figure 3. Baujat Influence Plot for Heterogeneity and Study Contribution in the Meta-analysis

Above Baujat plot displays each study's contribution to overall heterogeneity (I^2) and its influence on the pooled SMD. Most studies cluster between SMD −1.2 to −0.7 with high I^2, indicating consistent yet heterogeneous effects. A few dispersed points suggest studies with greater influence on variability. Overall, the pattern supports the stability of the pooled meta-analytic estimate

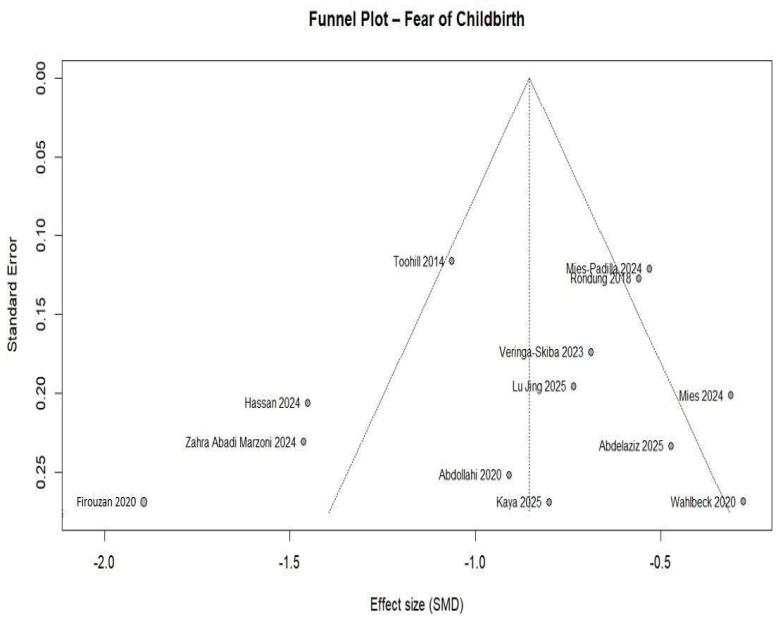

Figure 4. Funnel Plot for Fear of Childbirth (FoC) – Publication Bias Assessment

This funnel plot displays the relationship between study effect sizes (SMD) and their standard errors to evaluate potential publication bias. The plot shows a generally symmetrical pattern, indicating no major small-study effects, though a few extreme negative SMD values appear on the left. Larger studies cluster near the top with smaller standard errors, while smaller trials show wider dispersion at the bottom. Overall, visual inspection suggests minimal but possible mild asymmetry, warranting statistical confirmation with Egger's test.

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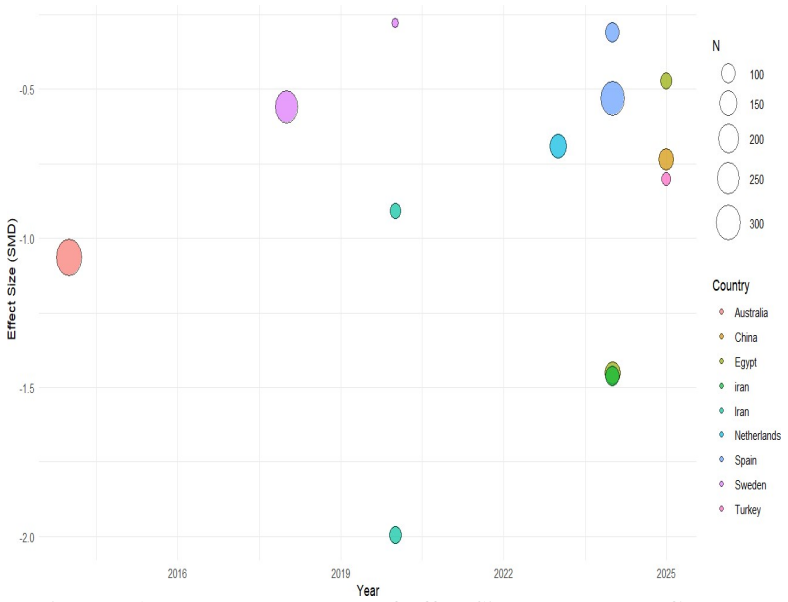

Figure 5. Advanced Bubble Plot of Effect Sizes by Year and Country

This bubble plot displays the standardized mean differences (SMD) for fear-of-childbirth interventions across studies, plotted by publication year. Each bubble represents one study, with bubble size proportional to the total sample size (N) and colour indicating the study's country. Most interventions produced moderate to large negative SMDs, reflecting substantial reductions in fear of childbirth. Studies from 2023–2025 cluster around stronger effects, suggesting improvement in intervention quality over time. The visual spread highlights considerable between-study heterogeneity consistent with the meta-analytic findings

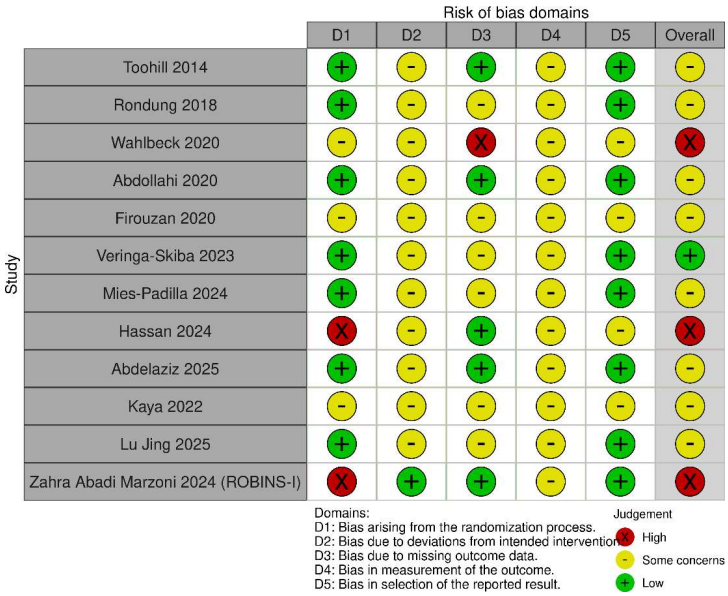

Figure 6. Traffic-Light Risk of Bias Summary (ROB-2 and ROBINS-I)

This traffic-light plot summarizes the risk of bias across all included studies using the ROB-2 tool for randomized trials and ROBINS-I for the quasi-experimental study. Most trials demonstrated **low to moderate concerns** for randomization, deviations from intervention, outcome measurement, and reporting. A few studies—particularly Hassan (2024) and Zahra Abadi Marzoni (2024)—showed **high risk** in at least one critical domain, mainly due to unclear sequence generation or non-randomized allocation

DISCUSSION (WITH CLICKABLE LINKS ADDED INSIDE CONTENT)

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The present study demonstrated that a midwife-led psycho-education intervention based on the BELIEF model significantly reduced fear of childbirth (FOC) and perceived stress among pregnant women. The intervention group showed a sharp decrease in FOC scores from **39.41 ± 7.02 to 29.91 ± 5.60**, while the control group showed an increase, resulting in an adjusted mean difference of **–10.51 (95% CI –11.60 to –9.41)**. These findings are highly consistent with global evidence supporting midwife-delivered psycho-educational interventions for reducing childbirth fear.

Our results align closely with the landmark randomized trial by **Toohill et al. (2014, Australia)**, which tested the BELIEF program delivered via telephone counselling and reported significant reductions in childbirth fear.(8) A similar pattern was observed in a Swedish trial by **Rondung et al. (2018)**, which found that internet-based cognitive behavioural therapy (ICBT) significantly reduced birth fear compared to standard antenatal care.(9)

Other psychological interventions have also shown strong effectiveness. For instance, **Abdollahi et al. (2020, Iran)** demonstrated that motivational-interviewing-based psychotherapy reduced both childbirth fear and perceived stress in pregnant women.(11) Similarly, **Firouzan et al. (2020, Iran)** implemented the BELIEF counselling model and observed significant reductions in W-DEQ scores, supporting the cultural adaptability of midwife-led psycho-education.(12) Alternative approaches also contribute to reducing fear. In Sweden, **Wahlbeck et al. (2020)** reported that group art therapy combined with counselling improved childbirth fear and emotional well-being among women attending fear-of-birth clinics.(10) Mindfulness-based programmes have shown similarly strong outcomes. The **MBCP trial by Veringa-Skiba et al. (2023, Netherlands)** demonstrated that mindfulness-based childbirth and parenting significantly reduced fear and anxiety in pregnant couples.(13)

In Spain, **Mies-Padilla et al. (2024)** conducted a randomized trial showing that midwife- led targeted interventions in specialised FoC clinics resulted in meaningful improvements in childbirth fear.(14) Evidence from low- and middle-income countries further supports these findings. **Hassan et al. (2024, Egypt)** reported that structured prenatal counselling significantly reduced childbirth fear and improved childbirth self-efficacy in primigravida women.(15) Digital interventions are also becoming increasingly important. The RCT by **Abdelaziz et al. (2025, Egypt)** demonstrated that an internet-based CBT programme delivered via smartphone effectively reduced tokophobia and improved coping.(16) In Turkey, **Kaya et al. (2022)** conducted a three- arm RCT during the COVID-19 pandemic and found that online solution-focused psychoeducation (SFP) and childbirth preparation training (CPT) both significantly lowered FOC levels.(17)

A newer form of culturally adapted intervention, the **SEEN storytelling programme**, was tested by **Lu Jing et al. (2025, China)** and demonstrated that narrative-based childbirth education significantly reduced childbirth fear by enhancing emotional processing and self-efficacy.(18) The results of the current study also mirror those reported by **Marzoni et al. (2024, Iran)**, where a telephone-based BELIEF psycho-education programme significantly reduced FOC and perceived stress, despite the quasi-experimental design.(19) Together, these studies confirm that childbirth fear is responsive to multiple forms of structured psychological support—including midwife-led counselling, CBT, mindfulness, storytelling, motivational interviewing, and expressive therapies. A common mechanism underlying these interventions appears to be the strengthening of self- efficacy, correction of maladaptive beliefs, reduction of anxiety, and enhancement of emotional preparedness for labour.

Although the present study used a quasi-experimental design, the direction and magnitude of the effect are highly consistent with multi-country RCTs. Therefore, this adds meaningful evidence supporting the scalability and accessibility of **telephone-based midwife-led psycho-education**, especially in resource-limited contexts where access to psychological services is limited.

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