Supplementary Material 1. PICOTS Framework for Non-Malignant Hysterectomy Using vNOTES Technique

Element	Definition	Application in vNOTES Guideline
P (Population)	Target patient group or clinical condition	Women scheduled for hysterectomy for benign indications (e.g., fibroids, adenomyosis, abnormal uterine bleeding, chronic pelvic pain)
I (Intervention)	Intervention under evaluation	Hysterectomy performed via transvaginal natural-orifice transluminal endoscopic surgery (vNOTES)
C (Comparison)	Alternative or comparator approach	Laparoscopic hysterectomy or conventional vaginal hysterectomy
O (Outcome)	Measured outcomes/effects	Operative time, hospital stay, hemoglobin decline, estimated blood loss, blood transfusion, postoperative pain, postoperative analgesic usage, re-admission, anal exhaust time, return to daily activity, sexual dysfunction, intraoperative complications, postoperative complications, urinary catheterization, conversion rates, cost analysis, quality of life
T (Time)	Follow-up duration	Early postoperative period (0-48 hours), hospitalization, and short-term follow-up (≤30 days)
S (Study Design)	Source of evidence/study type	Randomized controlled trials (RCTs), prospective cohort studies, meta-analyses

Supplementary Material 2. AMSTAR 2 Scoring Results – vNOTES Hysterectomy in benign gynecology (Systematic Reviews)

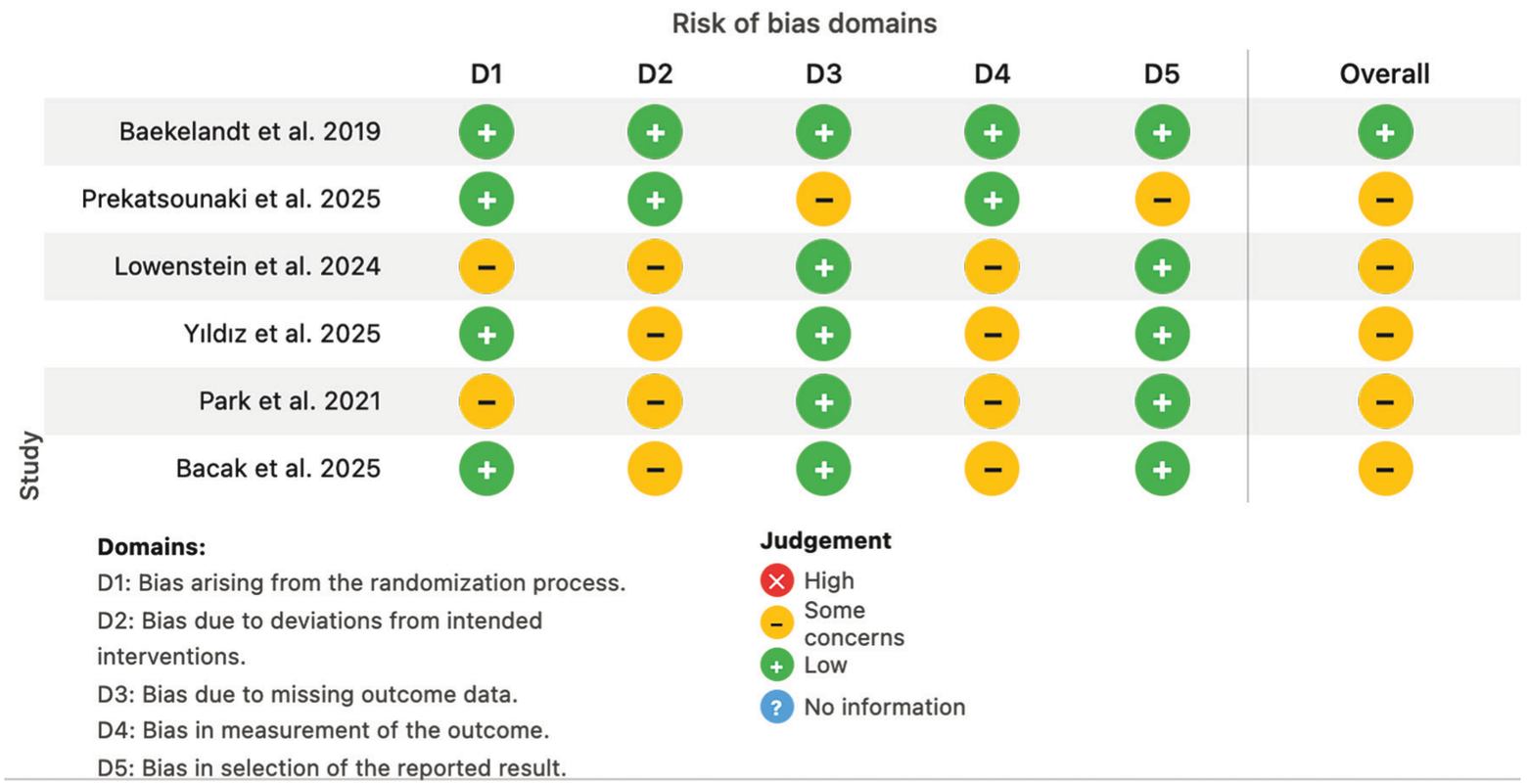
Study	AMSTAR 2 Items 16																Evidence
	1	2 ★	3	4 ★	5	6	7 ★	8	9 ★	10	11 ★	12	13 ★	14	15 ★	16	
Item description →	**PICO**	**Protocol registration**	**Study design justification**	**Comprehensive search**	**Dual selection**	**Dual extraction**	**Excluded studies list**	**Study description**	**RoB tool**	**Funding sources**	**Statistical methods**	**RoB impact**	**RoB in interpretation**	**Heterogeneity**	**Publication bias**	**Conflicts of interest**	
Housmans et al.[11] vNOTES vs. LH n=718	**Y**	**Y**	**PY**	**Y**	**PY**	**Y**	**N**	**Y**	**Y**	**N**	**Y**	**PY**	**Y**	**PY**	**N**	**Y**	**Low**
Marchand et al.[12,14] vNOTES vs. n=1310	**Y**	**Y**	**PY**	**PY**	**Y**	**PY**	**Y**	**Y**	**Y**	**N**	**Y**	**PY**	**Y**	**PY**	**N**	**Y**	**Low**
Pickett et al.[9] (Cochrane) All approaches n=6811	**Y**	**PY**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**High**
Sarkar et al.[13] vNOTES vs. LESS n=241	**Y**	**Y**	**PY**	**PY**	**Y**	**PY**	**N**	**Y**	**PY**	**N**	**PY**	**N**	**PY**	**PY**	**N**	**Y**	**Critically Low**
Marchand et al.[12,14] vNOTES vs. VH n=373	**Y**	**Y**	**PY**	**PY**	**Y**	**Y**	**PY**	**Y**	**Y**	**N**	**Y**	**PY**	**Y**	**PY**	**N**	**Y**	**Low**
Marchand et al.[17] R-vNOTES vs. RALH n=432	**Y**	**Y**	**Y**	**Y**	**Y**	**PY**	**PY**	**Y**	**PY**	**N**	**PY**	**PY**	**Y**	**PY**	**N**	**Y**	**Low**
Guan et al.[16] NMA (9 techniques) n=7640	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**PY**	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Low–Moderate**
Chaccour et al.[15] vNOTES vs. LH 7 studies	**Y**	**N**	**PY**	**Y**	**Y**	**Y**	**PY**	**Y**	**PY**	**N**	**N**	**N**	**PY**	**N**	**N**	**Y**	**Low**
Item reporting rate (%)	**100%**	**87.5%**	**87.5%**	**100%**	**100%**	**100%**	**75%**	**100%**	**100%**	**12.5%**	**87.5%**	**75%**	100%	87.5%	25%	100%	

Y = Yes (fully met) PY = Partial Yes (partially met) N = No (not met) ★ = Critical domain (7 items)

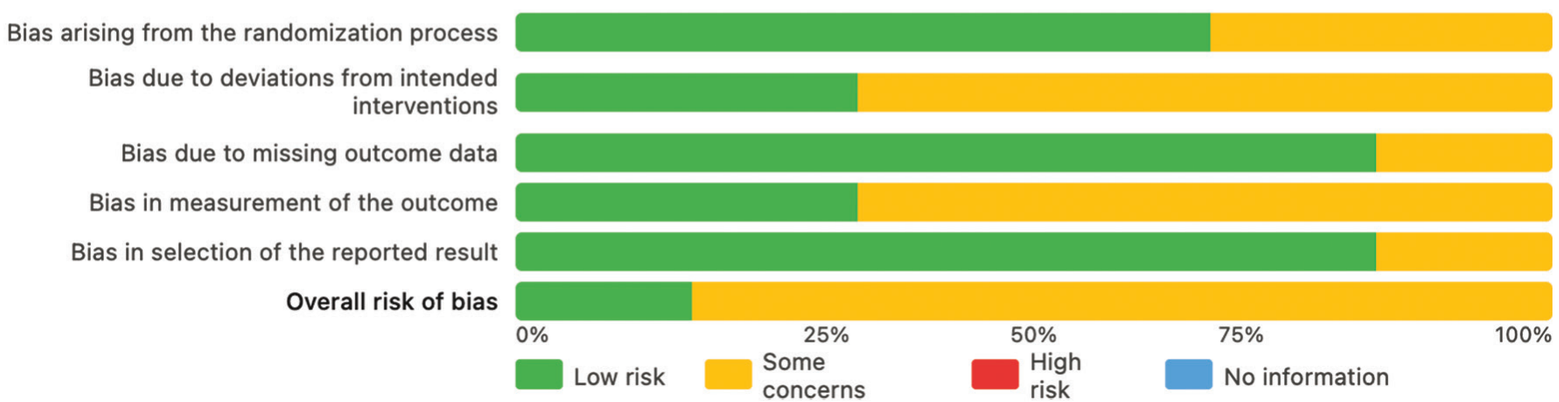
Methodological quality assessment of eight included systematic reviews across 16 items (n = 8) | ★ = Critical domain

Note: Item reporting rate = (fully reported + partially reported studies) / total studies × 100. Critical domains (Items 2, 4, 7, 9, 11, 13, 15): per AMSTAR 2, a single critical domain weakness combined with one non-critical weakness reduces overall confidence to 'Low'; multiple critical weaknesses result in 'Critically Low'. LH: Laparoscopic hysterectomy · VH: Vaginal hysterectomy · LESS: Laparoendoscopic single-site surgery. R-vNOTES: Robotic vNOTES · RALH: Robot-assisted laparoscopic hysterectomy · NMA: Network meta-analysis.

(a)



(b)



Supplementary Material 3. Risk of bias assessment of included randomized controlled trials using the Revised Cochrane Risk of Bias tool (RoB 2). **(a)** Domain-level judgements for each study across five domains: D1, bias arising from the randomization process; D2, bias due to deviations from intended interventions; D3, bias due to missing outcome data; D4, bias in measurement of the outcome; D5, bias in selection of the reported result. **(b)** Summary distribution of risk of bias judgements across all studies per domain and overall. Green (+) = low risk; Yellow (−) = some concerns; Red (*X*) = high risk; Blue (?) = no information.

Supplementary Material 4. Risk of Bias Assessment of Included Retrospective Studies using ROBINS-I tool								
First Author, Year	D1★	D2★	D3	D4	D5	D6★	D7	Overall
	Confounding	Selection	Classification	Deviations	Missing data	Measurement	Reporting	ROBINS-I
Matak et al., 2024[26]	✕	✕	+	−	+	+	−	✕ Serious
Kaya et al.,[27] 2022	−	−	+	−	+	−	−	− Moderate
Albayrak Denizli et al.,[28] 2025	−	−	+	−	+	−	−	− Moderate
Kheirbek et al.,[29] 2023	−	−	+	−	+	+	−	− Moderate
Kaya et al.,[30] 2022	−	−	+	−	+	−	−	− Moderate
Güngördük et al.[31] 2025	✕	−	+	−	−	+	−	✕ Serious
Timmermans et al.,[32] 2025	✕	✕	+	−	−	✕	−	✕ Serious
Sarikaya et al.,[33] 2025	✕	−	+	−	+	+	−	✕ Serious
Kurçaloğlu et al.,[34] 2025	✕	−	−	−	−	−	✕	✕ Serious
Basol et al.,[35] 2021	−	−	+	−	+	−	−	− Moderate
Merlier et al.,[36] 2022	✕	✕	+	−	+	+	−	− Moderate
Xie and Cao[37] 2025	−	−	+	−	+	+	−	− Moderate
Yang et al.,[38] 2020	✕	✕	+	−	+	−	✕	✕ Serious
Chen et al.,[39] 2020	✕	✕	+	−	−	+	✕	✕ Serious
Puisungnoen et al.,[40] 2020	+	−	+	−	+	−	−	− Moderate
Badiglian-Filho et al.,[41] 2021	−	−	+	−	+	+	−	− Moderate
Yuan et al.,[42] 2024	−	−	+	−	+	+	−	− Moderate
Aiob et al.,[43] 2025	✕	−	+	−	+	+	−	✕ Serious
Bulutlar et al.,[44] 2025	−	−	+	−	+	+	−	− Moderate
Uluutku Bulutlar et al.,[45] 2025	−	−	+	−	+	−	−	− Moderate
Ozceltik et al.,[46] 2022	−	✕	−	−	+	+	−	✕ Serious
Zhang et al.,[47] 2024	✕	✕	+	−	+	+	−	✕ Serious
Güngördük et al.,[48] 2025	✕	✕	+	−	+	+	−	✕ Serious
Yang et al.,[49] 2014	−	−	+	−	+	+	−	− Moderate
Baron et al.[50] 2022	✕	✕	+	−	+	+	−	✕ Serious
Lim et al.,[51] 2025	−	−	+	−	+	+	−	− Moderate
Wang et al.,[52] 2015	−	−	+	−	+	+	−	− Moderate
Halisçelik et al.,[53] 2025	−	−	+	−	+	−	−	− Moderate
Imai et al.,[54] 2023	−	−	+	−	−	−	−	− Moderate
Isono et al.,[55] 2023	✕	−	+	−	+	+	✕	✕ Serious
Kaya et al.,[56] 2020	−	−	+	−	+	+	−	− Moderate
Jiamset et al.[57] 2024	✕	−	+	−	+	+	−	✕ Serious
Kim et al.,[58] 2018	✕	✕	+	−	−	+	✕	✕ Serious
Dujardin et al.,[59] 2025	−	−	+	−	+	+	−	− Moderate
Mollahüseyinoğlu Küllac et al.,[60] 2024	−	−	+	−	+	+	−	− Moderate
Donmez et al.,[61] 2024	✕	✕	−	−	+	+	✕	✕ Serious
Qian et al.,[63] 2024	✕	−	+	✕	+	−	−	✕ Serious

★ Critical domains.

Judgement

D1=Confounding

+ Low risk

D2=Participant selection

− Moderate risk

D3=Classification of interventions

✕ Serious risk

D4=Deviations from intended interventions

D5=Missing data

D6=Measurement of outcomes

D7=Selection of reported result