

The Postoperative Analgesic Efficacy of Three Peripheral Nerve Blocks in Hip Fracture Surgery: A Systematic Review and Meta-Analysis of Randomised Trials

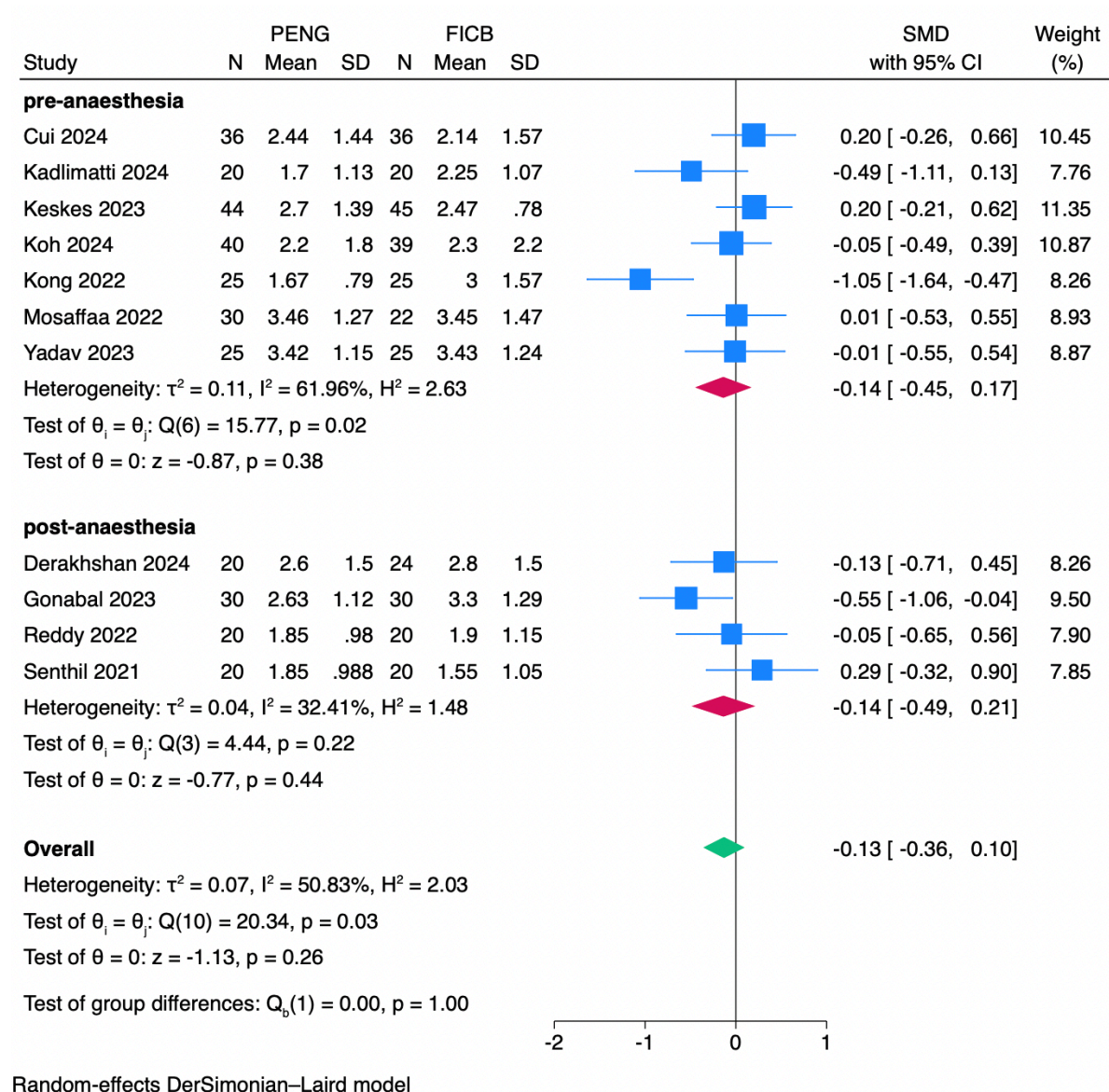
Analysis report

Table of contents

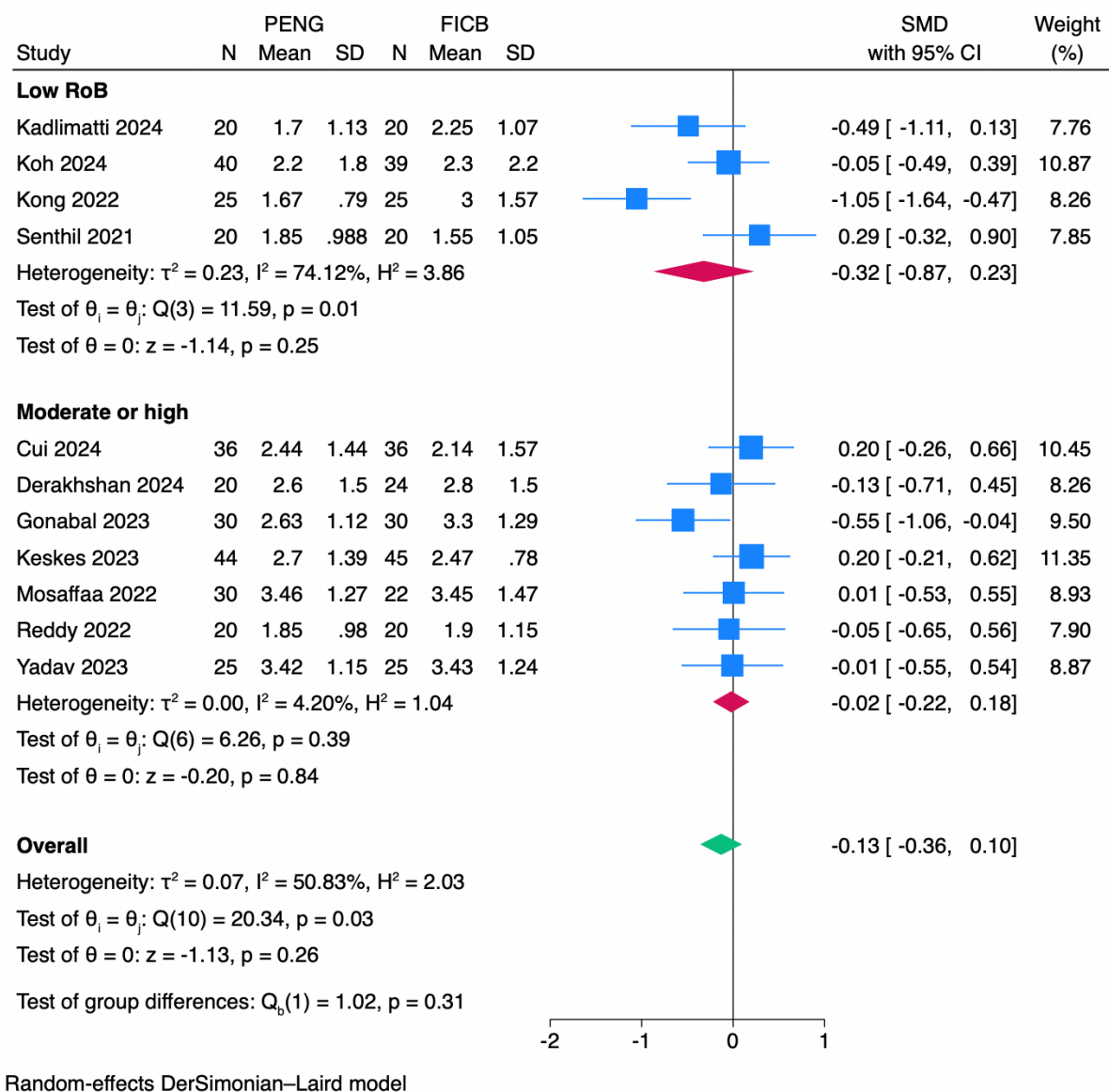
Pain scores at 6 hours postoperatively	2
Subgroup analysis	2
Sensitivity (Leave-one-out)	8
Funnel plot	8
Pain scores at 12 hours postoperatively	9
Subgroup analysis	9
Sensitivity (Leave-one-out)	15
Pain scores at 24 hours postoperatively	16
Subgroup analysis	16
Sensitivity (Leave-one-out / outlier)	22
Funnel plot	23
Dynamic pain scores at 6 hours postoperatively	24
Forest plot	24
Subgroup analysis	24
Sensitivity (Leave-one-out)	29
Dynamic pain scores at 24 hours postoperatively	30
Forest plot	30
Subgroup analysis	30
Sensitivity (Leave-one-out)	35
Consumption of OMEs in 24 hours postoperatively	36
Subgroup analysis	36
Sensitivity (Leave-one-out / outlier)	43
Table of Drug Conversions to Oral Morphine Equivalents (OMEs)	44

Pain scores at 6 hours postoperatively – subgroup analyses

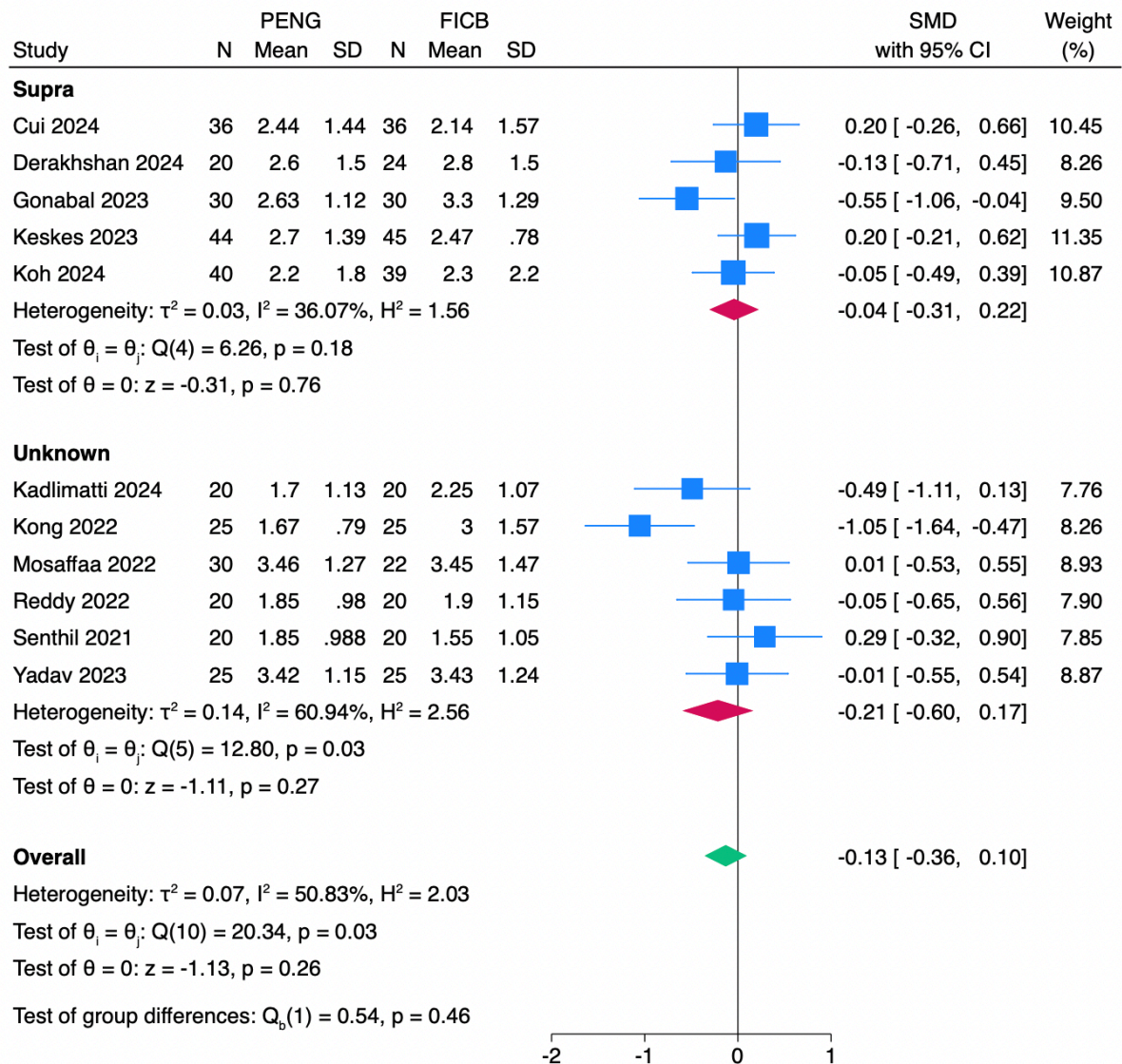
Pain at 6 hours postoperatively - timing of administration of the block (pre- or post-anaesthesia)



Pain at 6 hours postoperatively - low risk of bias

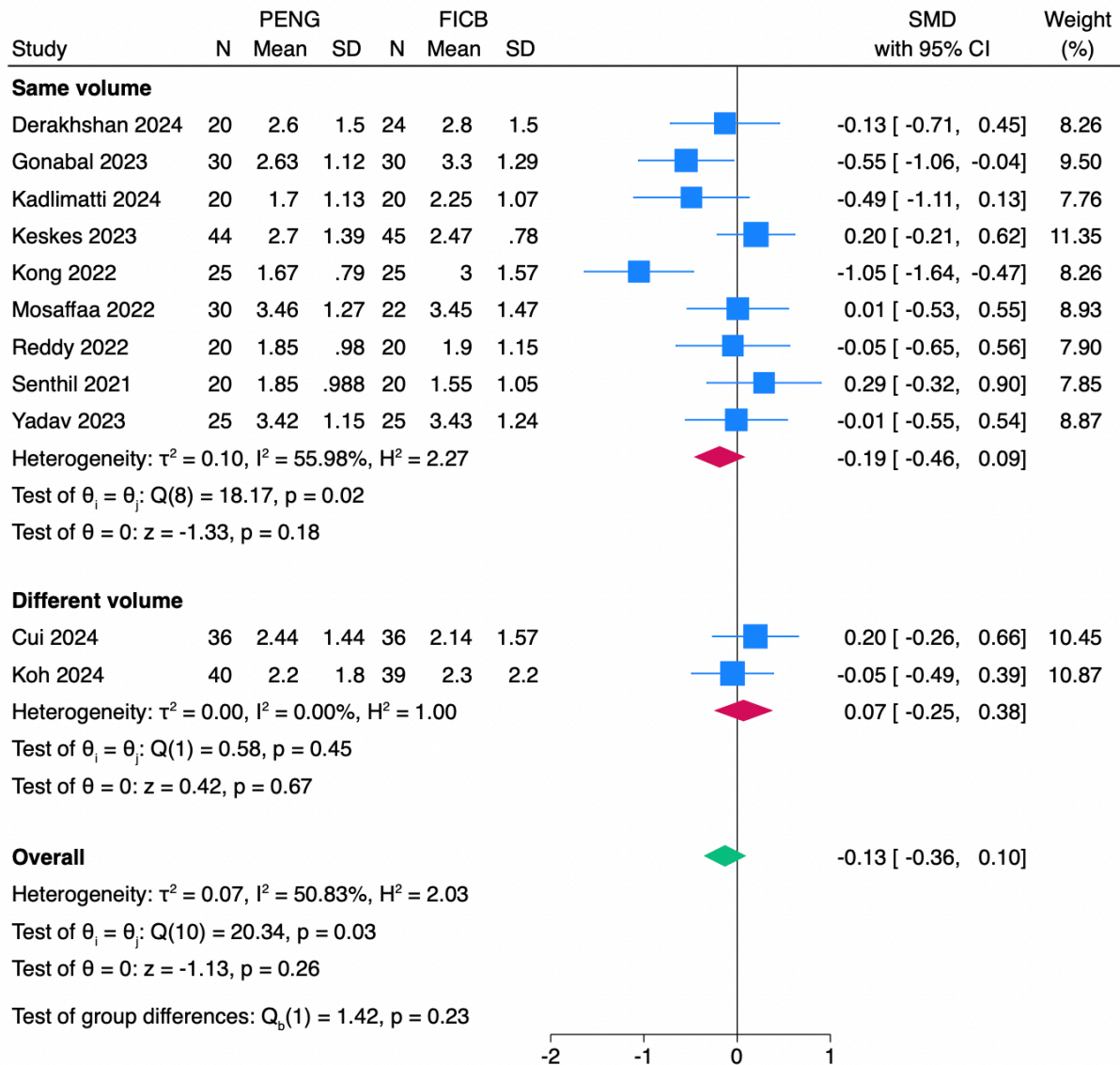


Pain at 6 hours postoperatively - supra-inguinal approach of FICB vs infra-inguinal or unknown



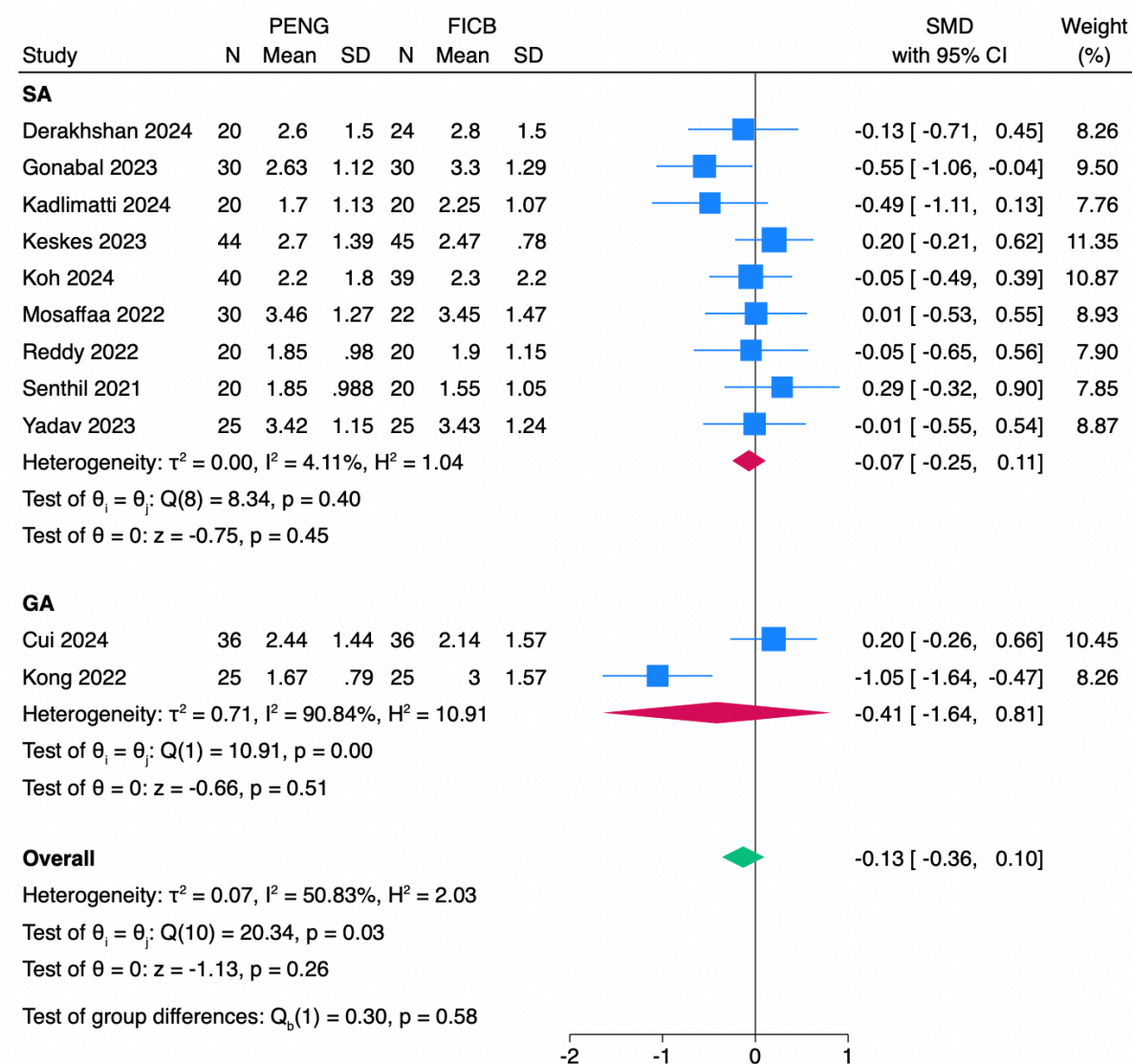
Random-effects DerSimonian–Laird model

Pain at 6 hours postoperatively - different volumes/doses of anaesthetic used in each group



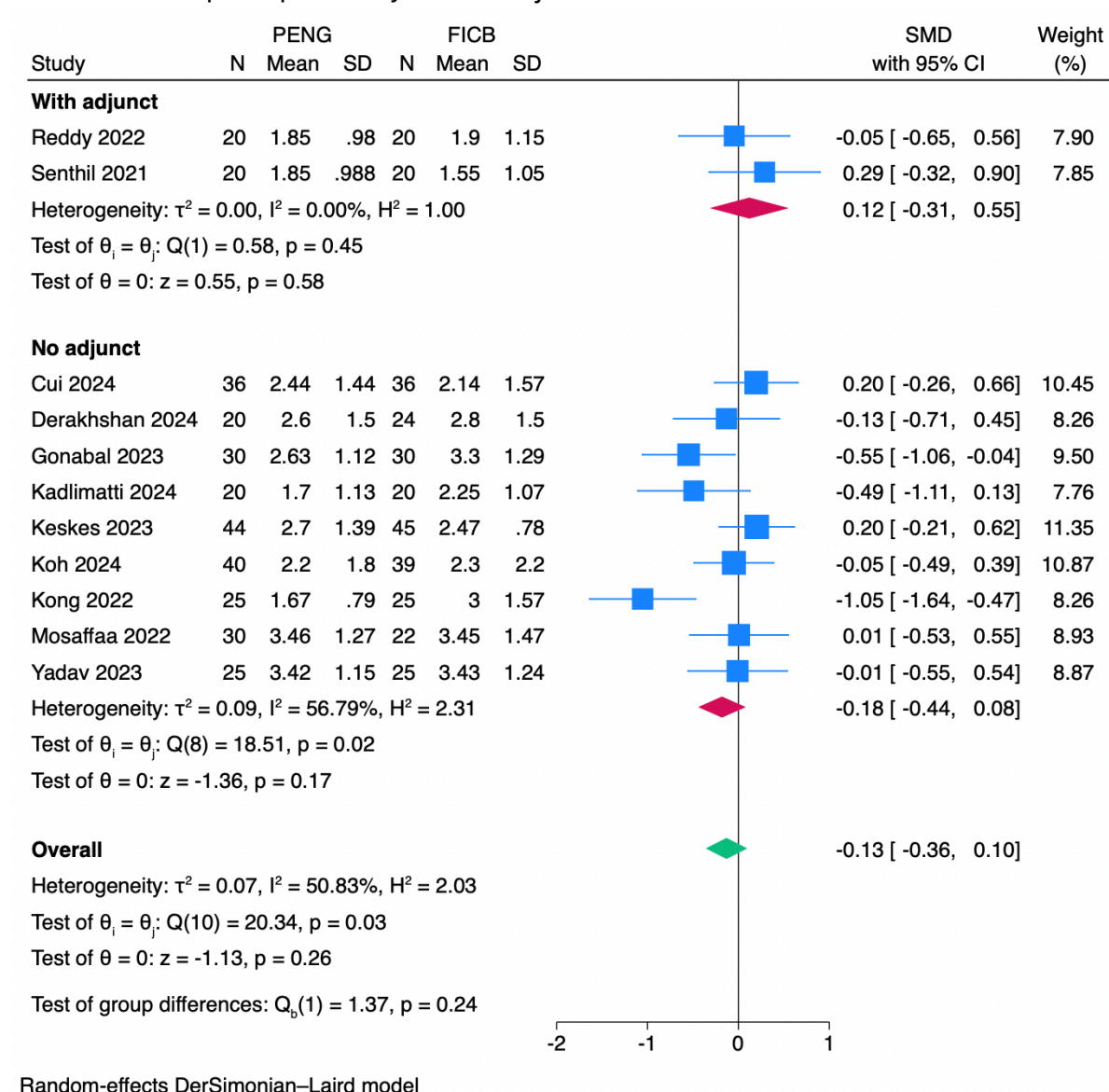
Random-effects DerSimonian–Laird model

Pain at 6 hours postoperatively - spinal or general anaesthetic

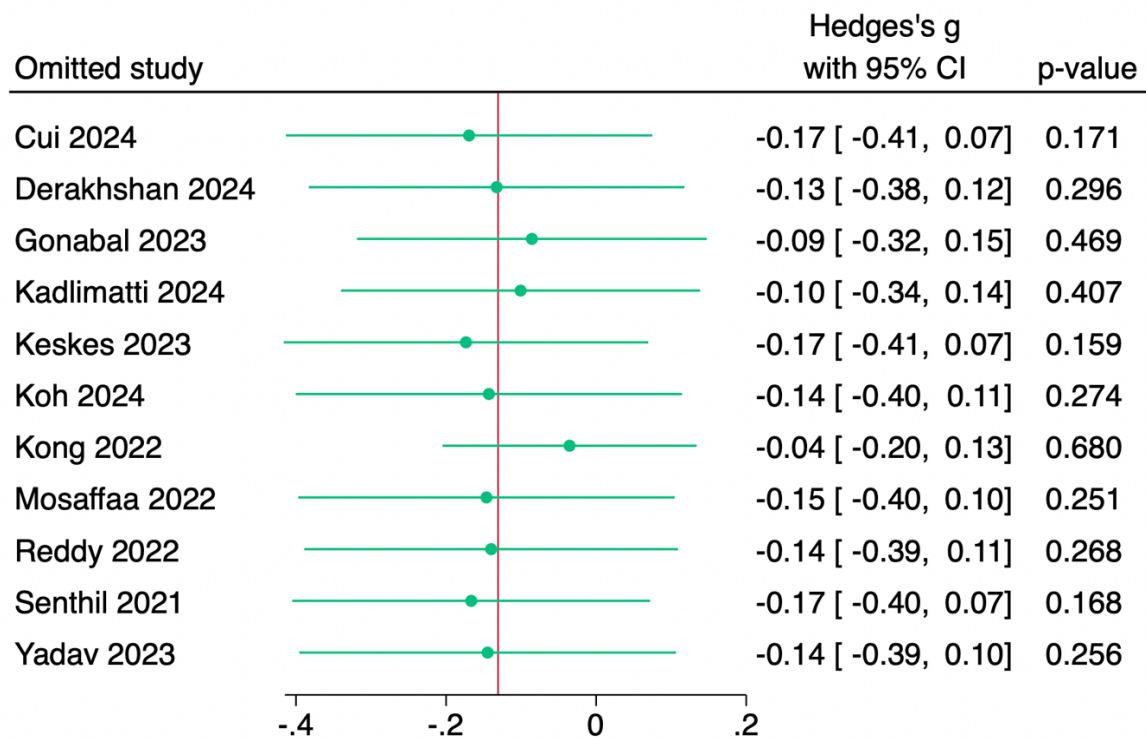


Random-effects DerSimonian–Laird model

Pain at 6 hours postoperatively - block adjunct use

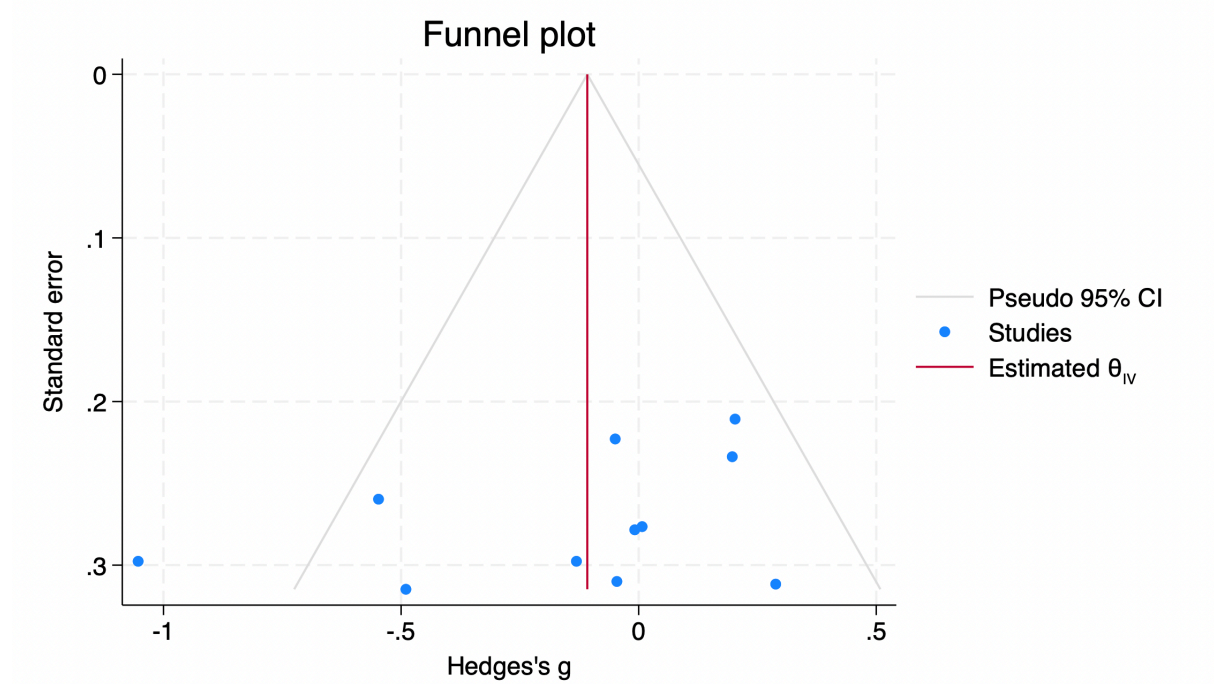


Pain at 6 hours postoperatively - leave-one-out analysis



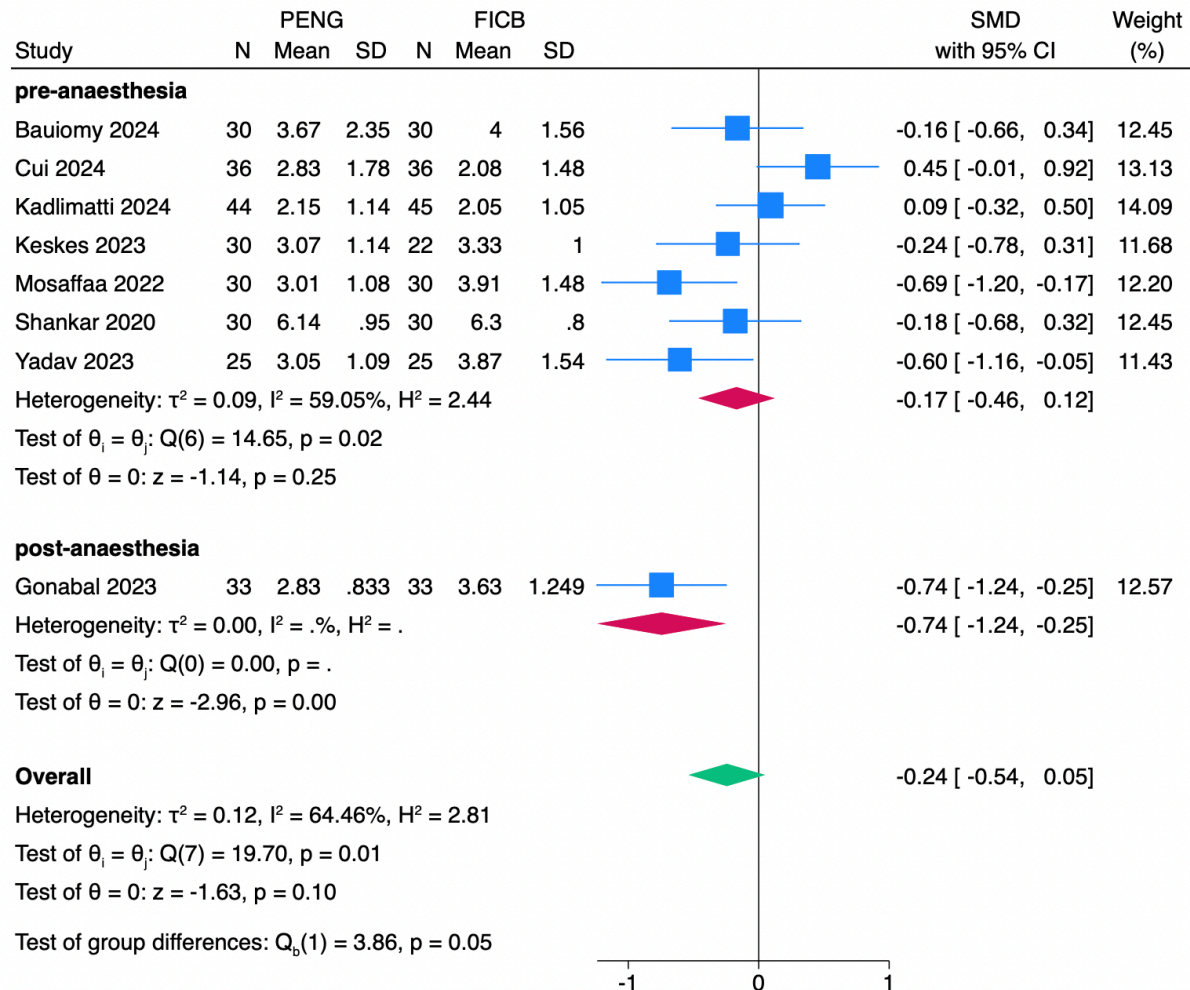
Random-effects DerSimonian–Laird model

Pain at 6 hours postoperatively – funnel plot



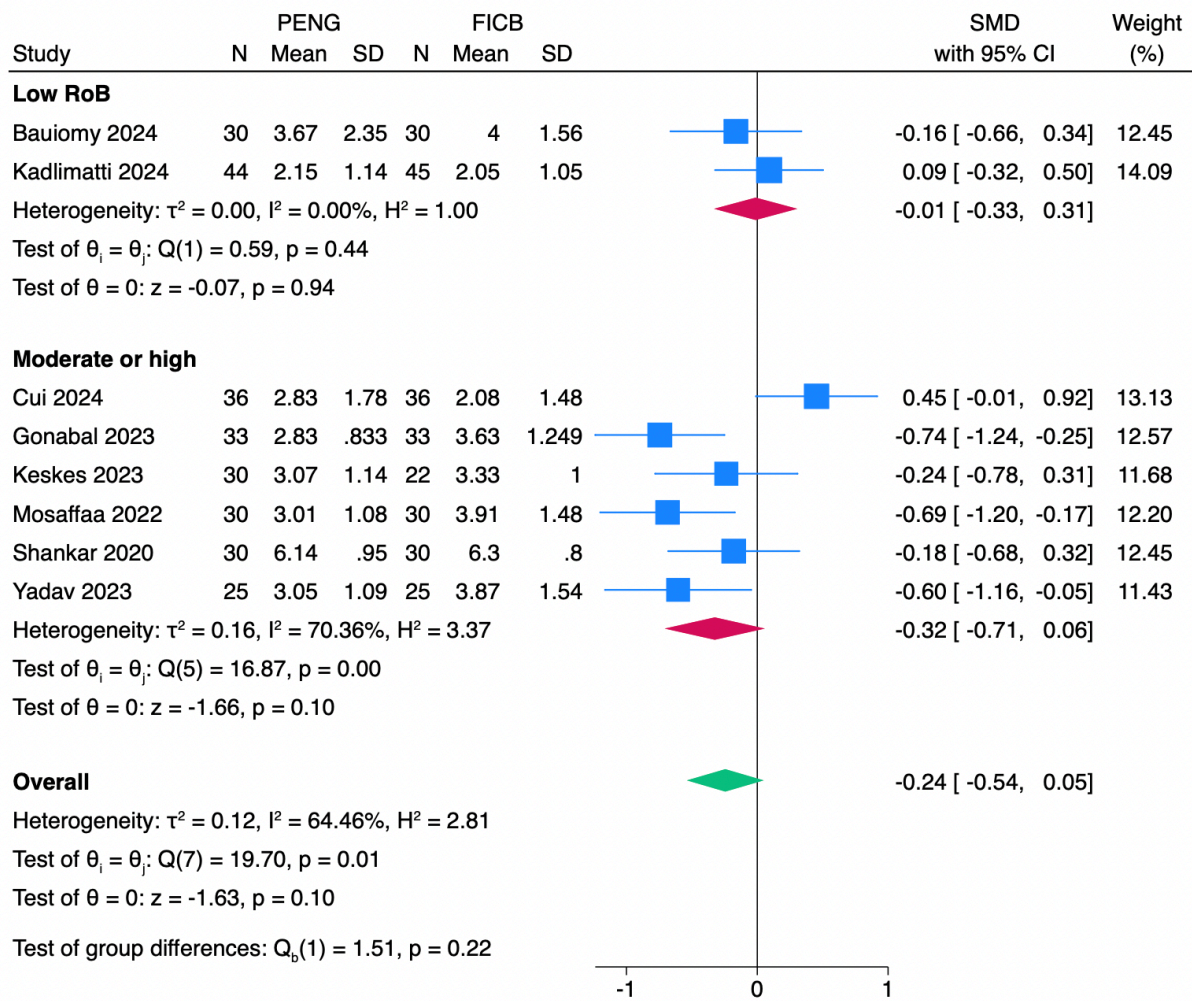
Pain scores at 12 hours postoperatively – subgroup analyses

Pain at 12 hours postoperatively - timing of administration of the block (pre- or post-anaesthesia)



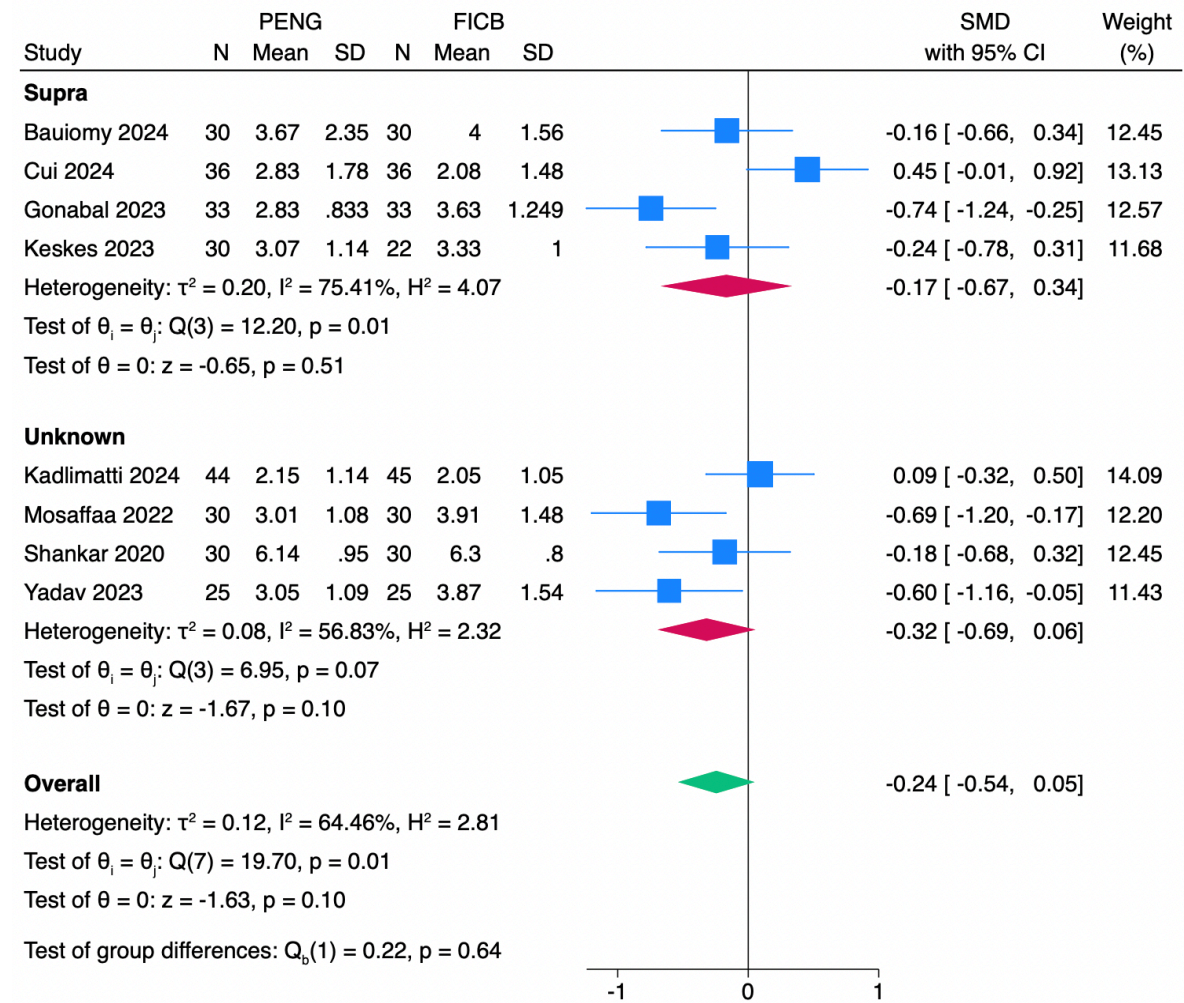
Random-effects DerSimonian–Laird model

Pain at 12 hours postoperatively - low risk of bias



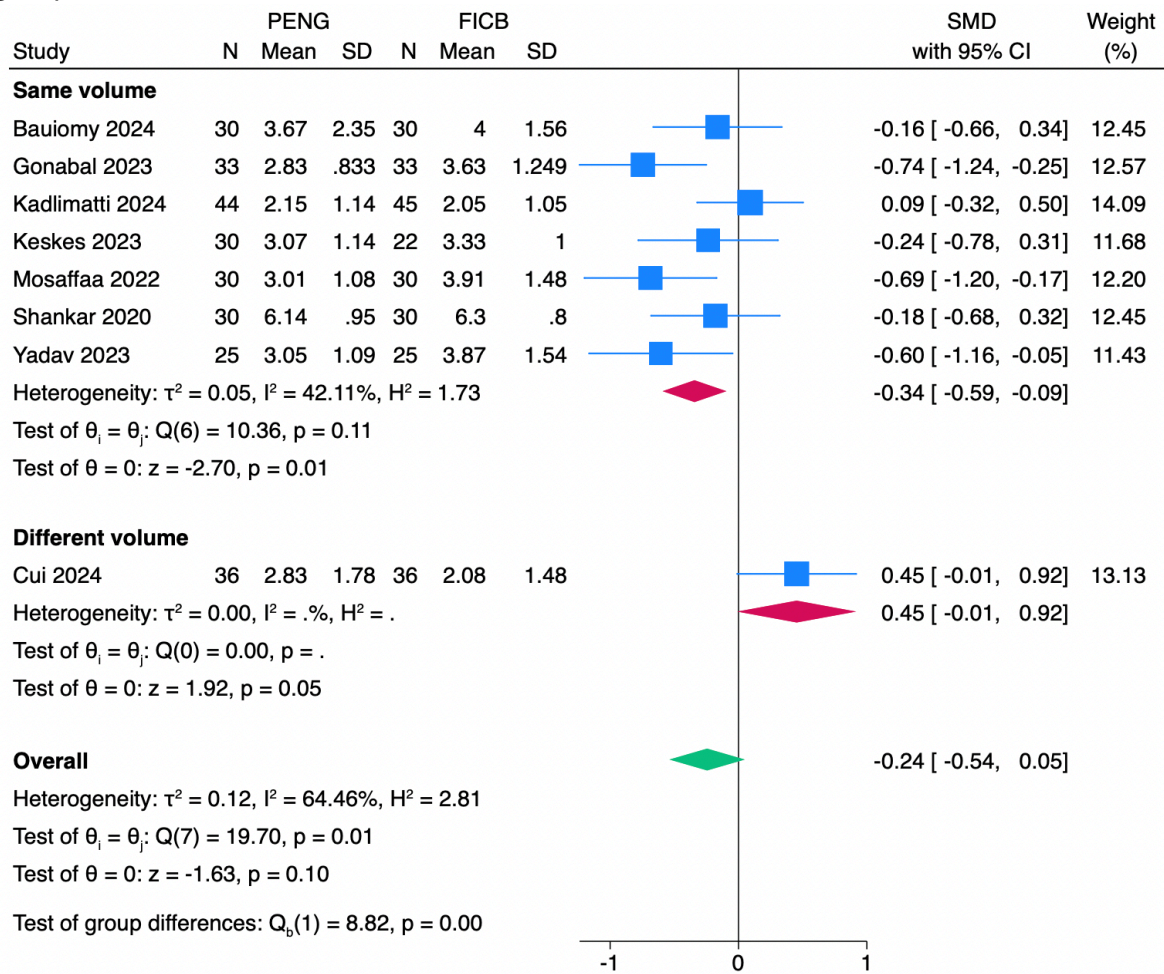
Random-effects DerSimonian–Laird model

Pain at 12 hours postoperatively - supra-inguinal approach of FICB vs infra-inguinal or unknown



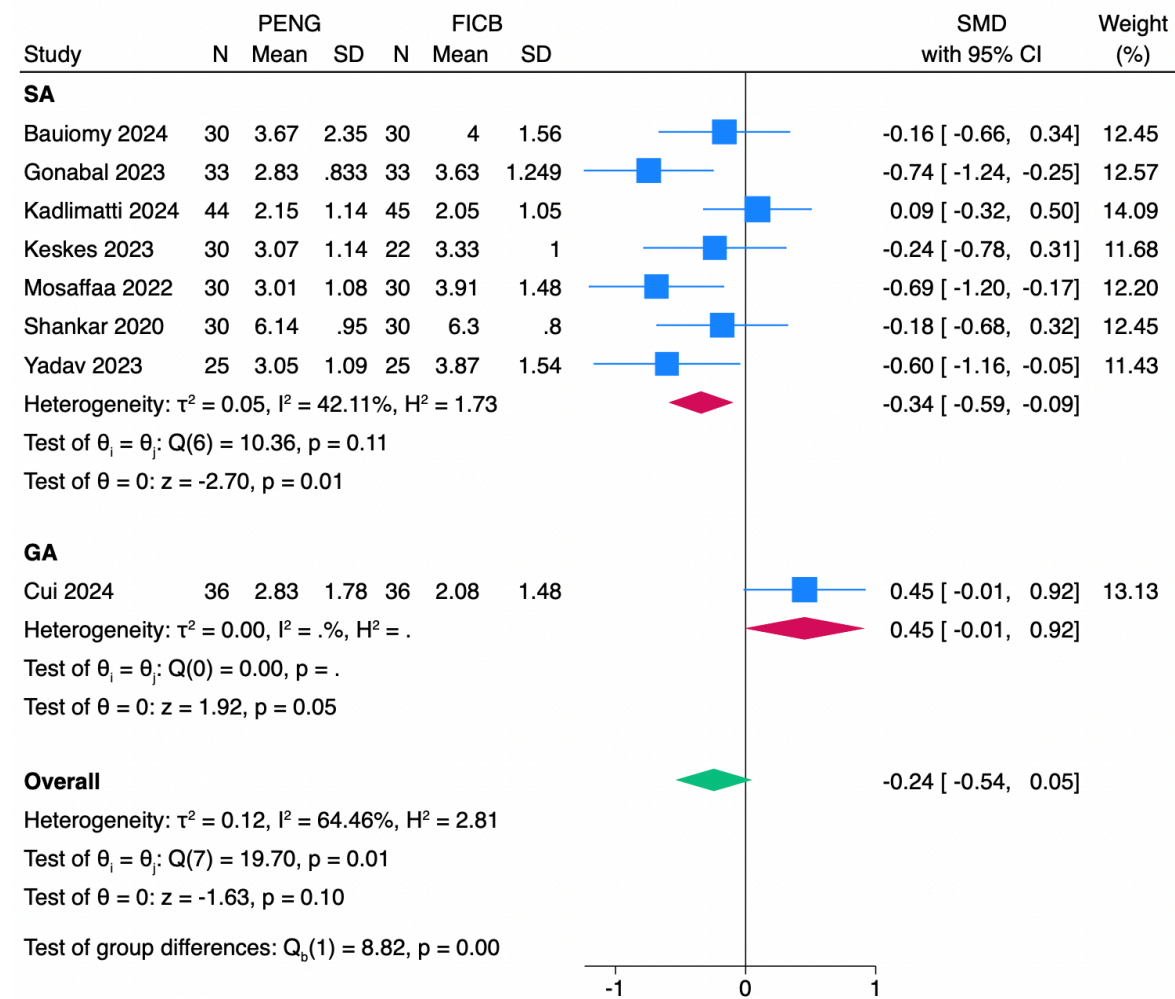
Random-effects DerSimonian–Laird model

Pain at 12 hours postoperatively - different volumes/doses of anaesthetic used in each group



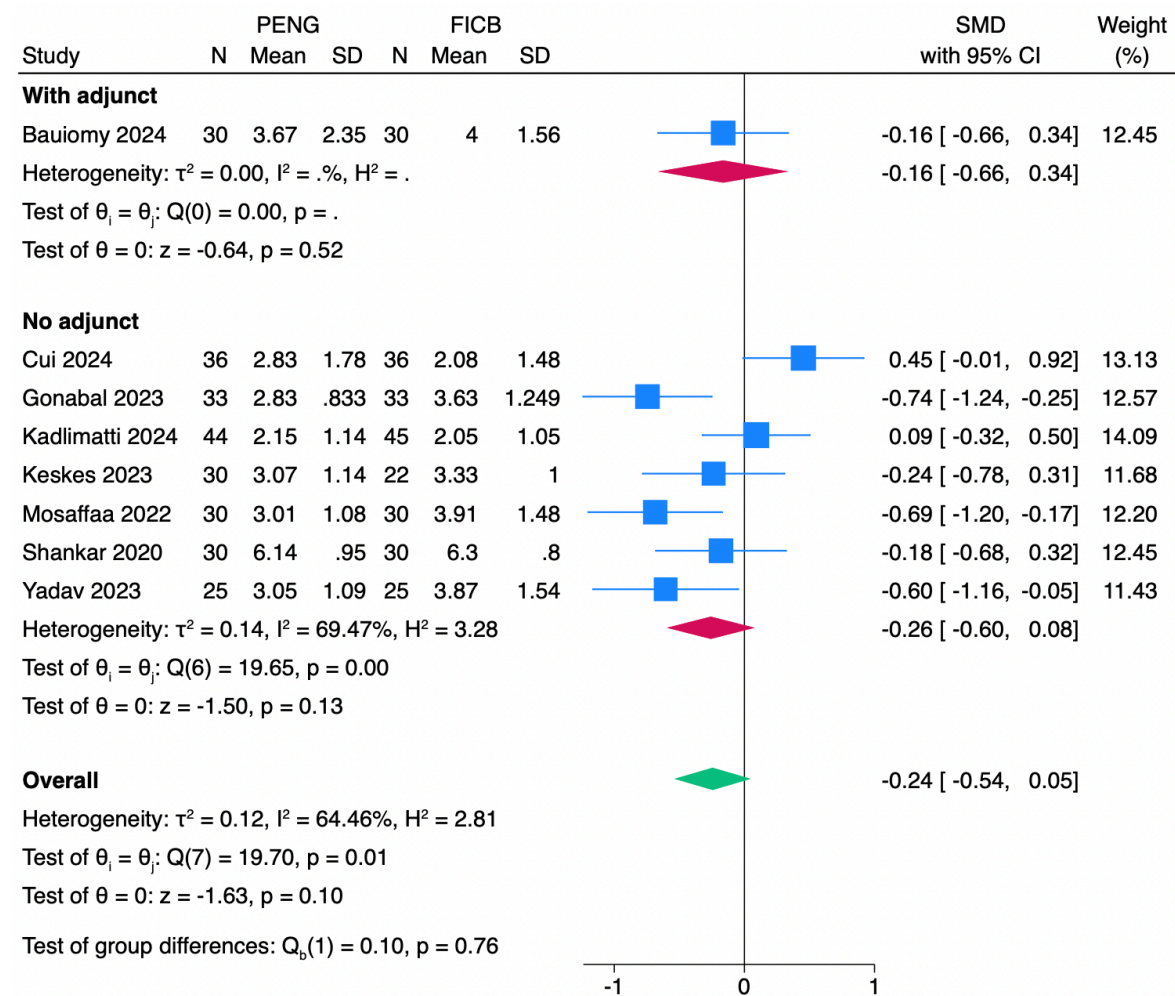
Random-effects DerSimonian–Laird model

Pain at 12 hours postoperatively - spinal or general anaesthetic



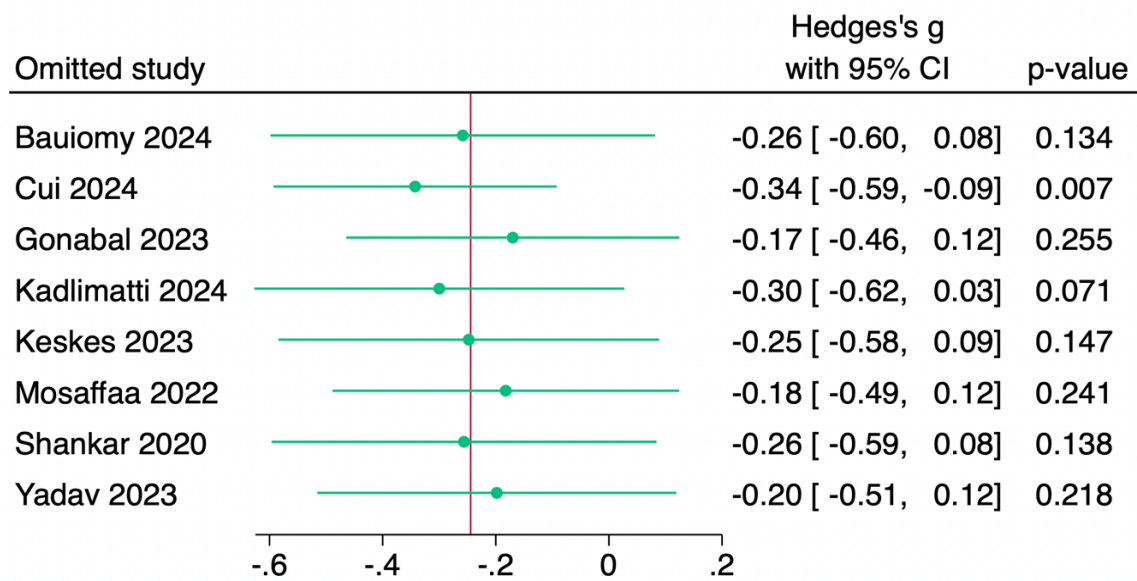
Random-effects DerSimonian–Laird model

Pain at 12 hours postoperatively - block adjunct use



Random-effects DerSimonian-Laird model

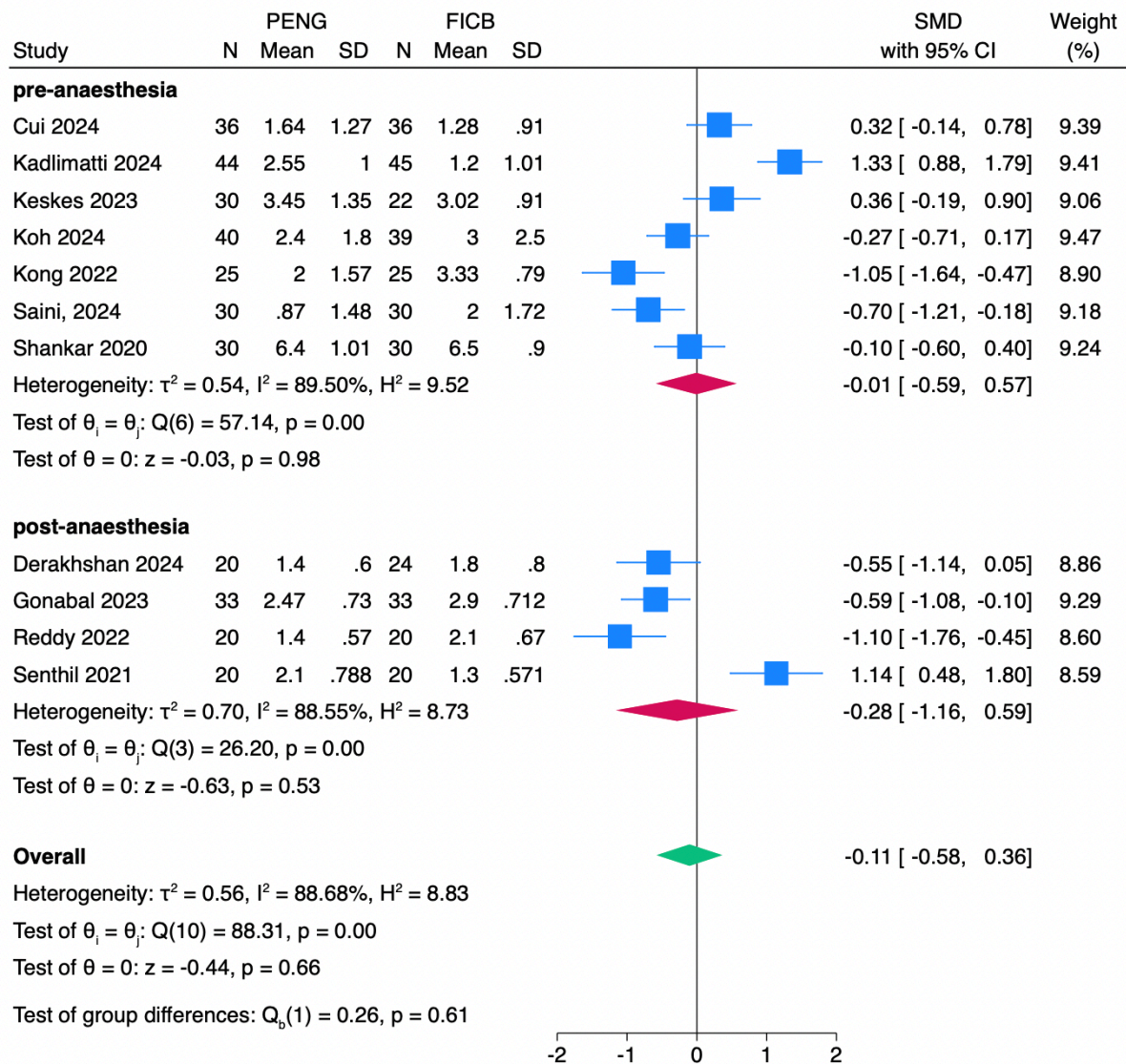
Pain at 12 hours postoperatively - leave-one-out analysis



Random-effects DerSimonian–Laird model

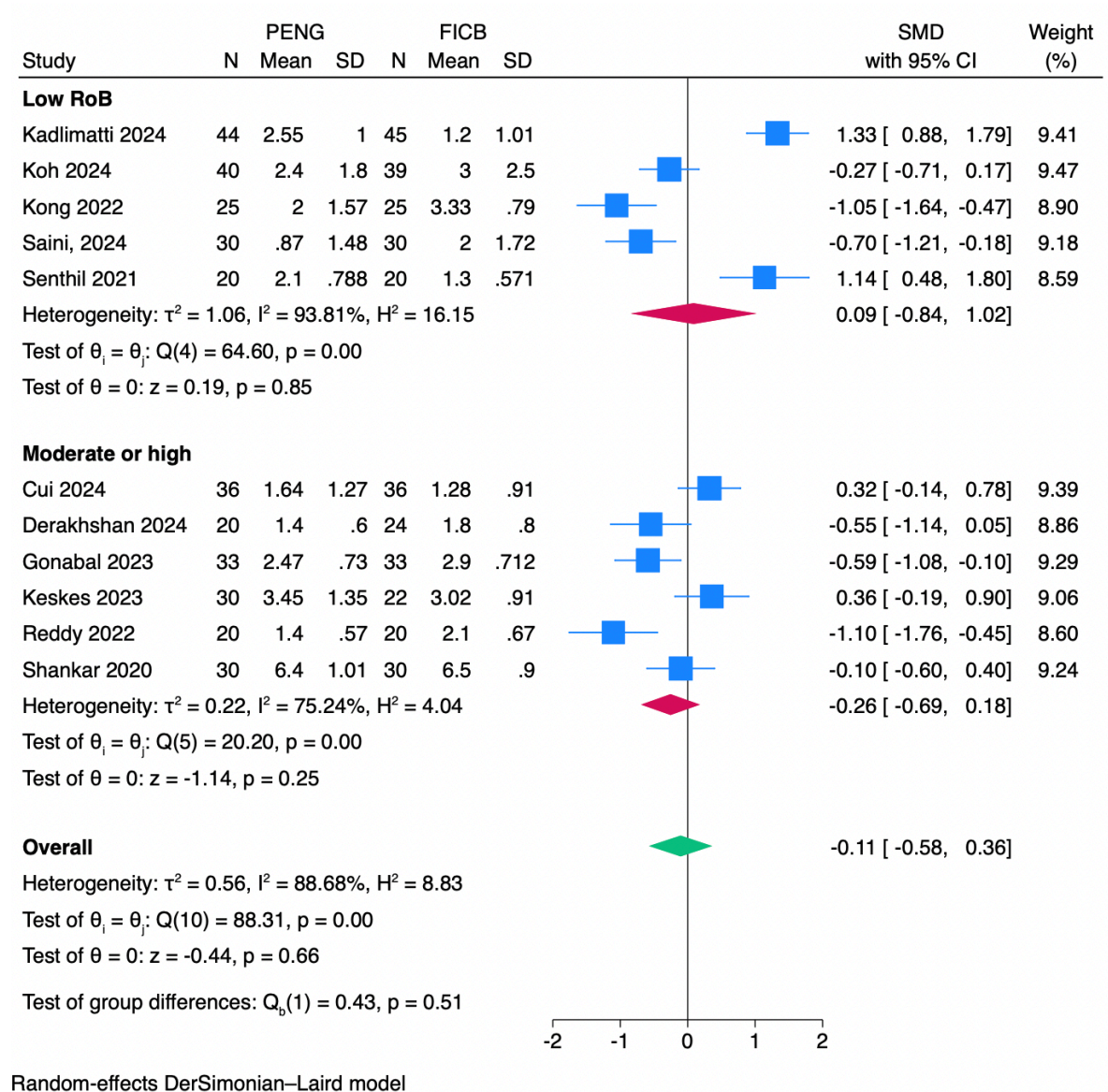
Pain scores at 24 hours postoperatively – subgroup analyses

Pain at 24 hours postoperatively - timing of administration of the block (pre- or post-anaesthesia)

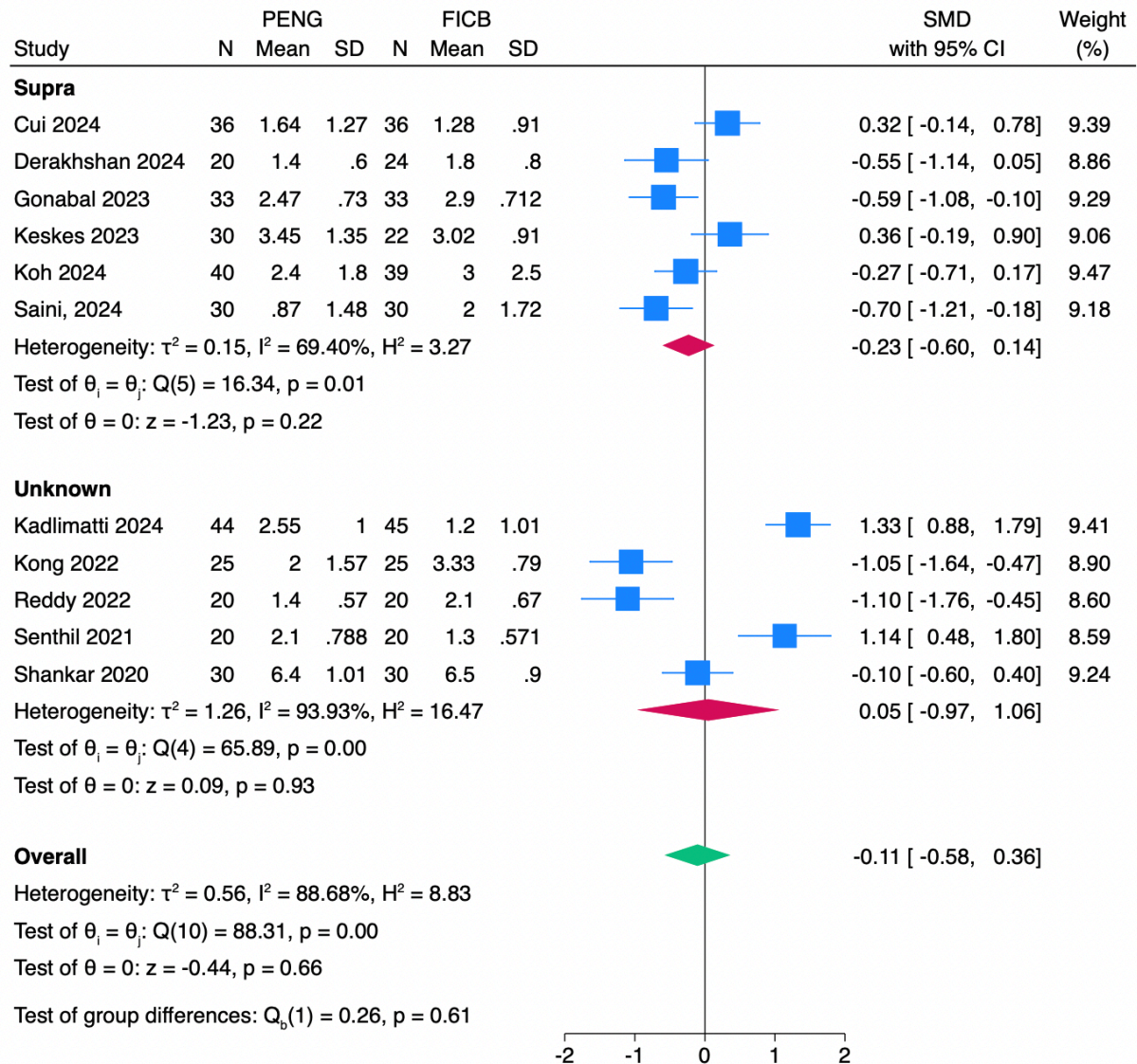


Random-effects DerSimonian–Laird model

Pain at 24 hours postoperatively - low risk of bias

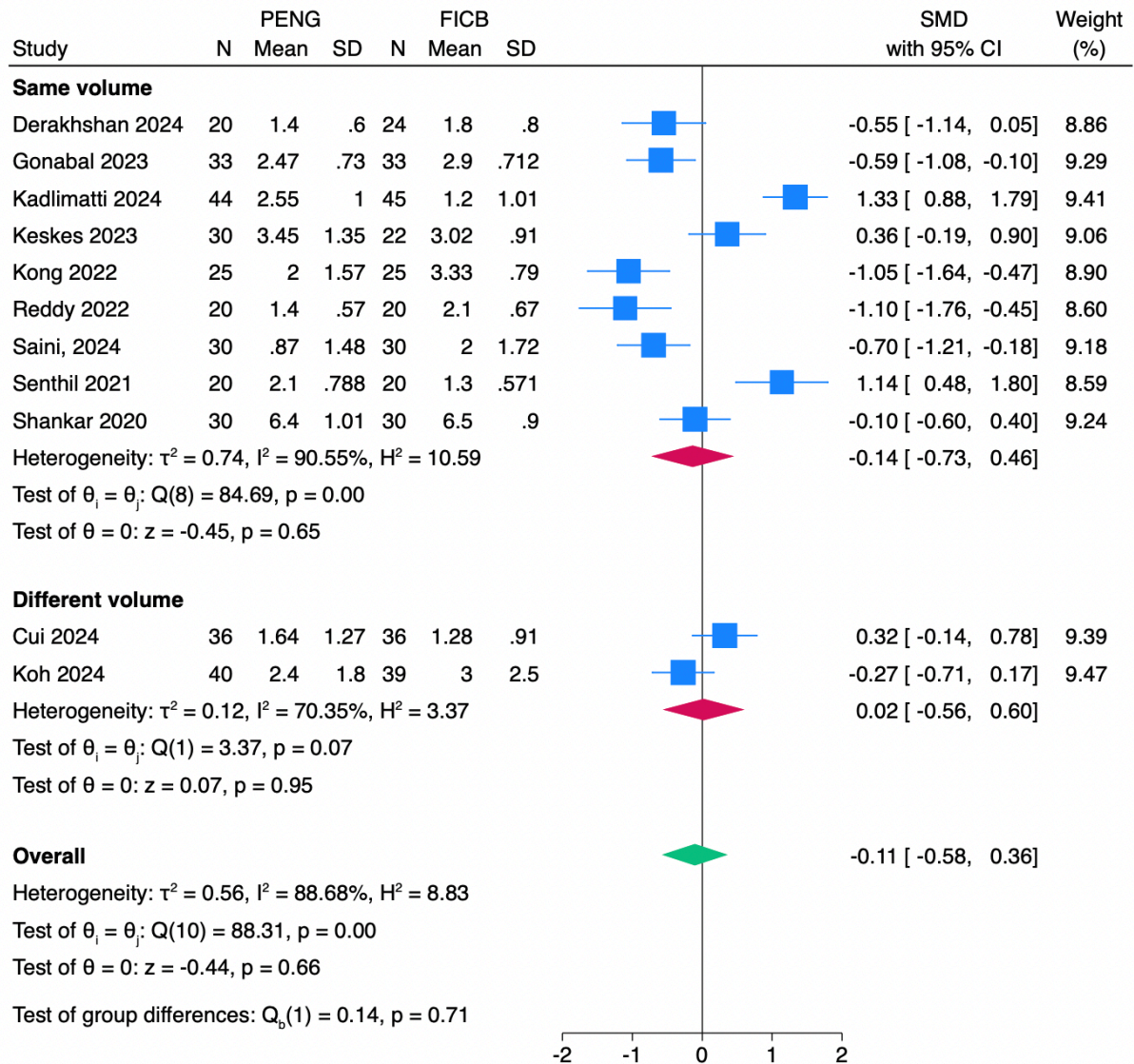


Pain at 24 hours postoperatively - supra-inguinal approach of FICB vs infra-inguinal or unknown



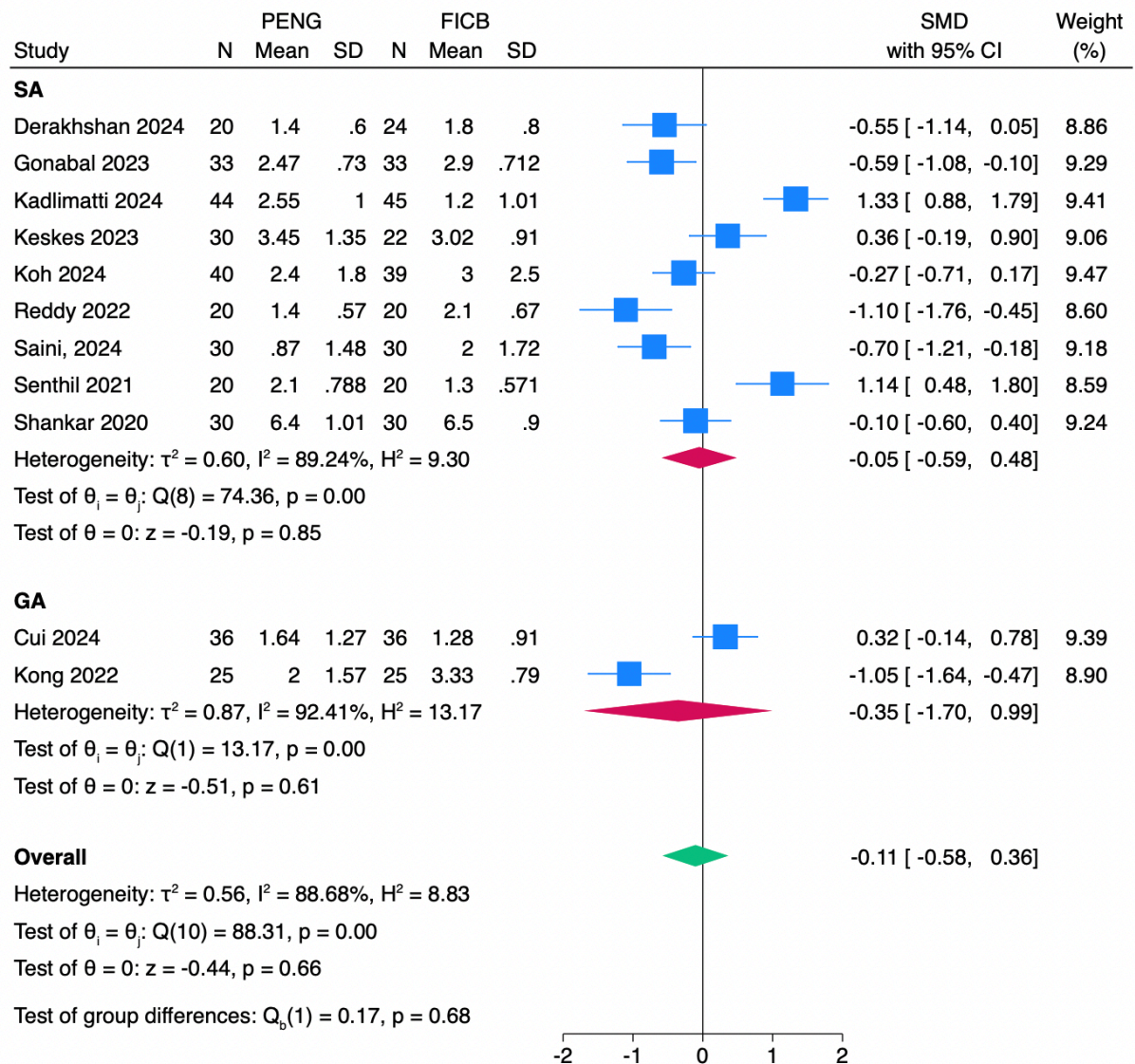
Random-effects DerSimonian–Laird model

Pain at 24 hours postoperatively - different volumes/doses of anaesthetic used in each group



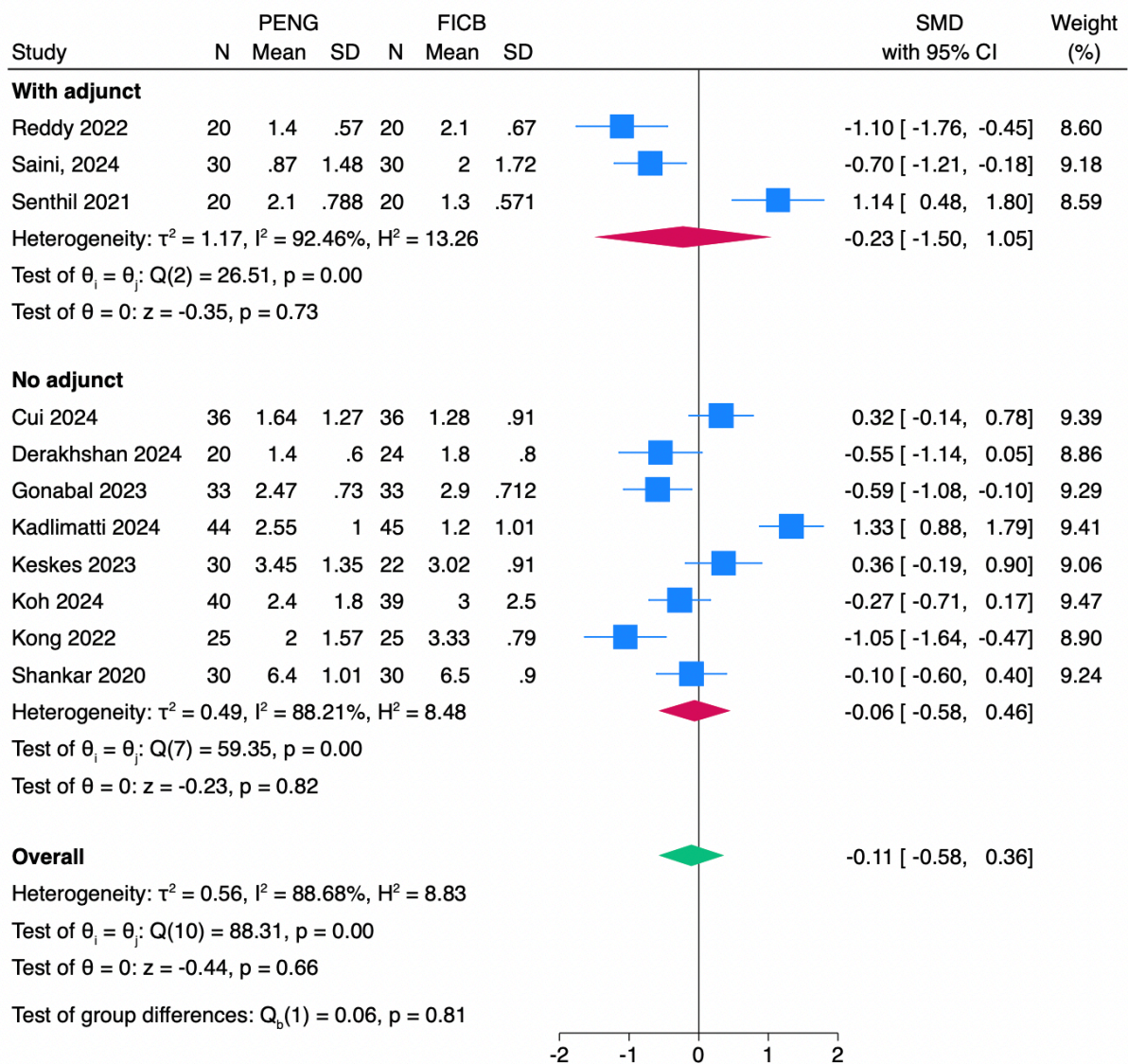
Random-effects DerSimonian–Laird model

Pain at 24 hours postoperatively - spinal or general anaesthetic



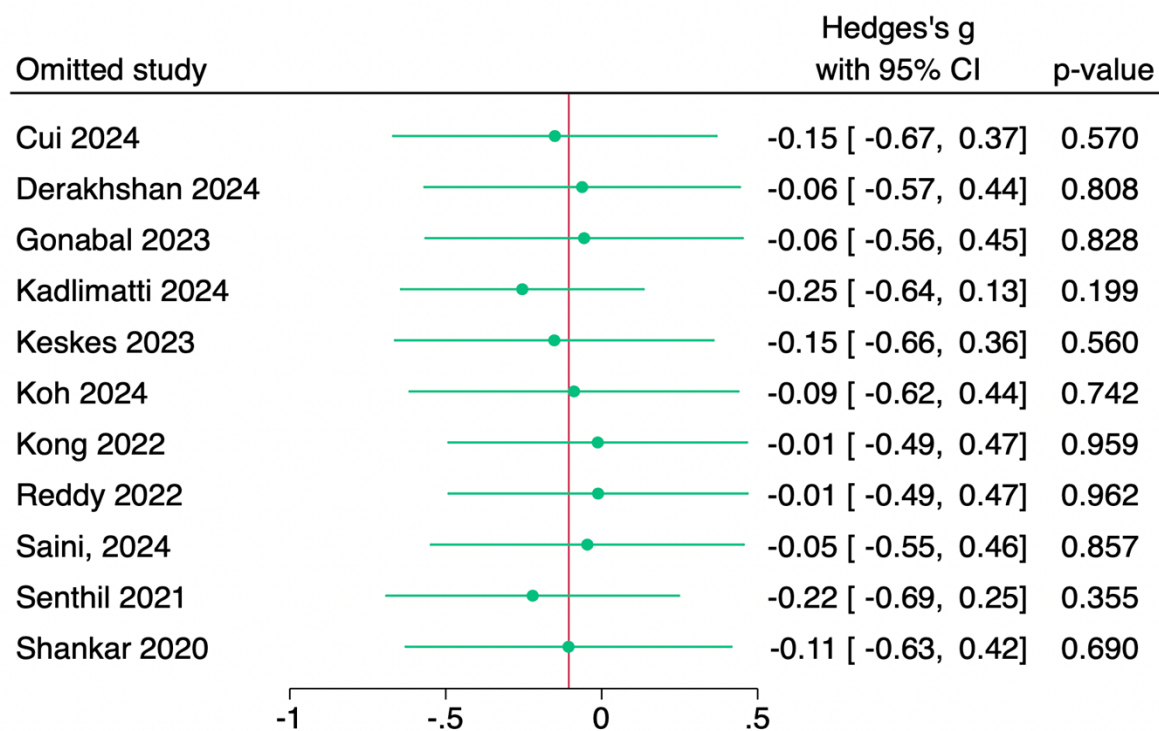
Random-effects DerSimonian–Laird model

Pain at 24 hours postoperatively - block adjunct use



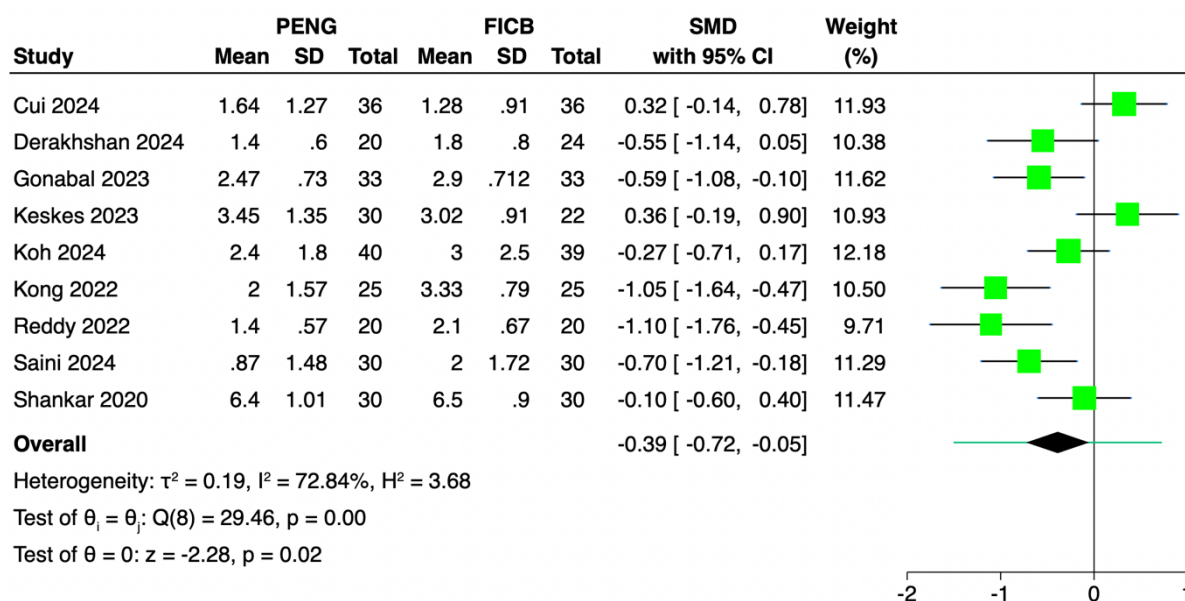
Random-effects DerSimonian–Laird model

Pain at 24 hours postoperatively - leave-one-out analysis



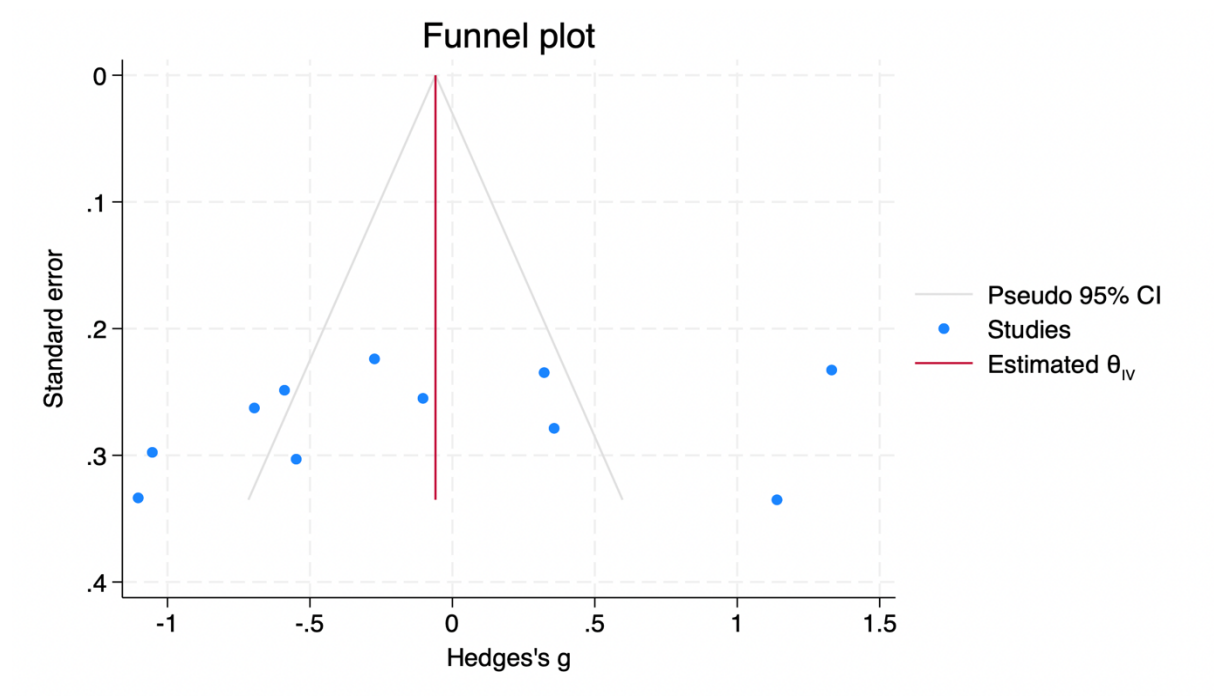
Random-effects DerSimonian–Laird model

Pain at 24 hours postoperatively - outlier analysis



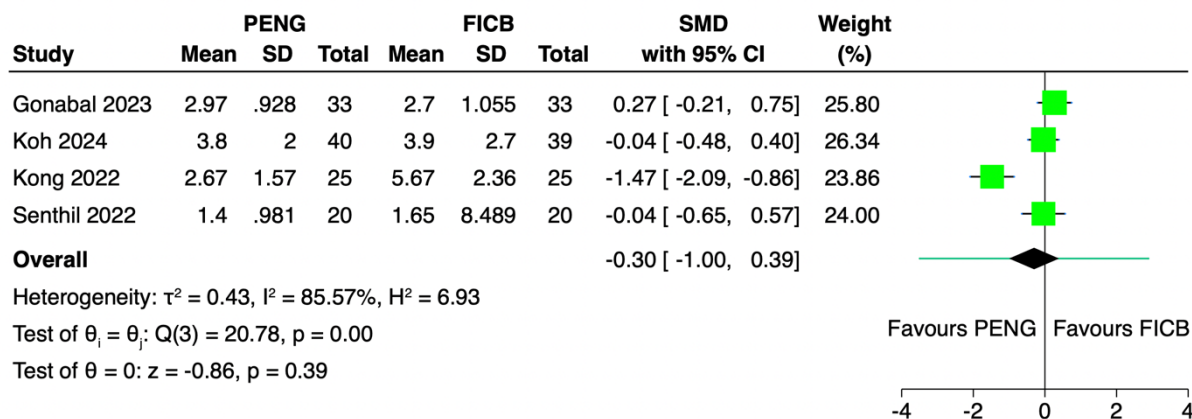
Random-effects DerSimonian–Laird model
 95% prediction interval

Pain at 24 hours postoperatively – funnel plot



Dynamic pain scores at 6 hours postoperatively

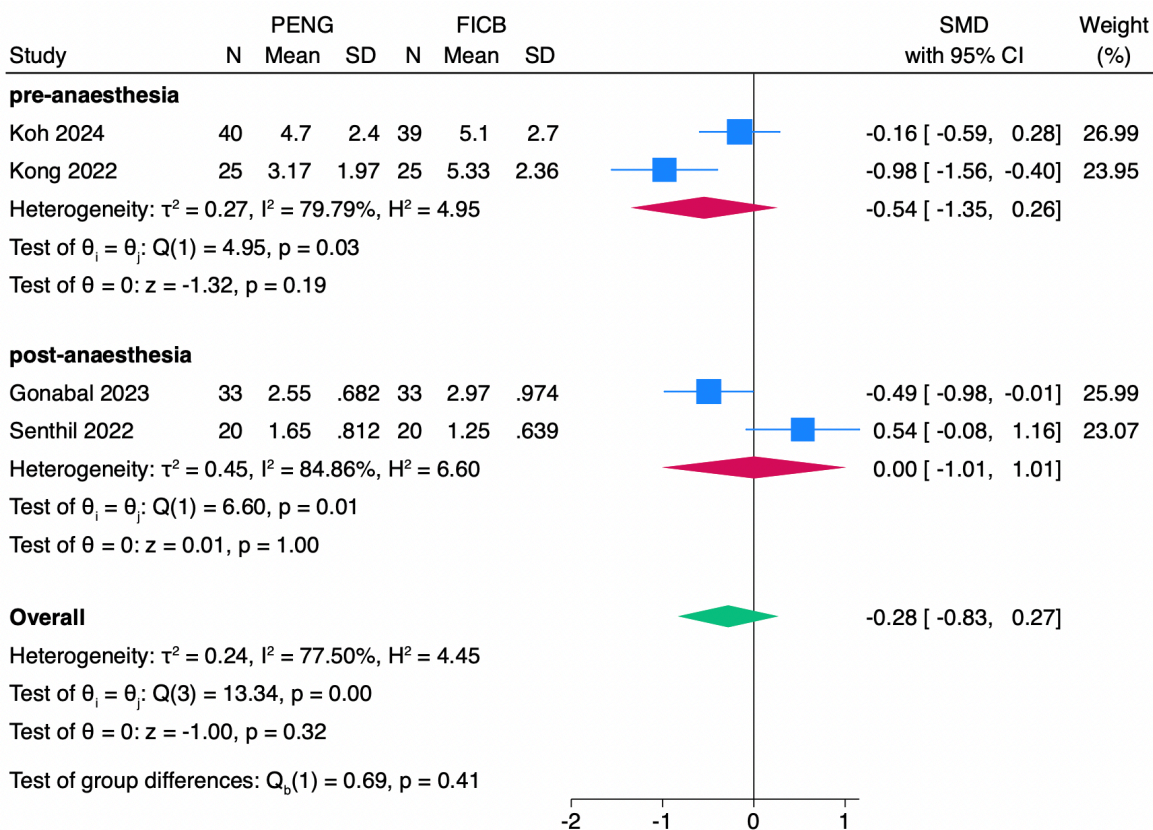
Dynamic pain scores at 6 hours postoperatively – forest plot



Random-effects DerSimonian–Laird model
 95% prediction interval

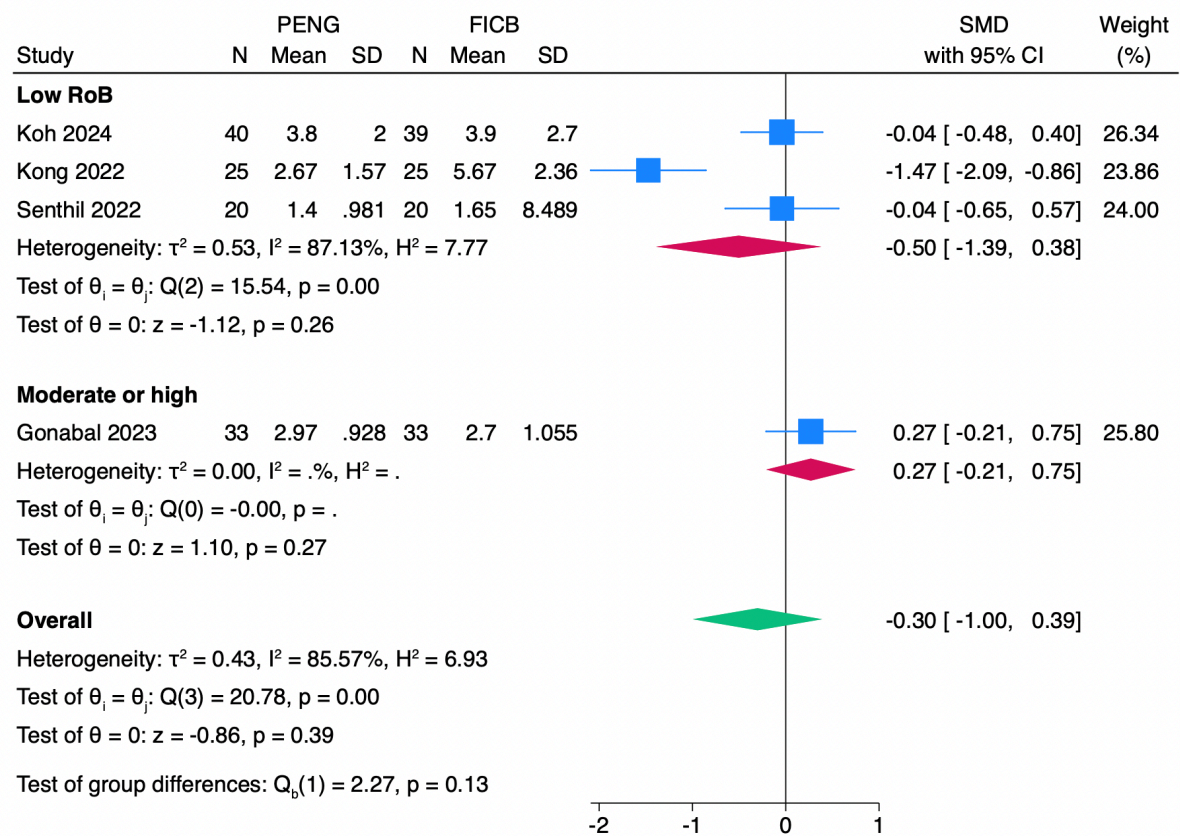
Dynamic pain scores at 6 hours postoperatively – subgroup analyses

Dynamic pain at 6 hours postoperatively - timing of administration of the block (pre- or post-anaesthesia)



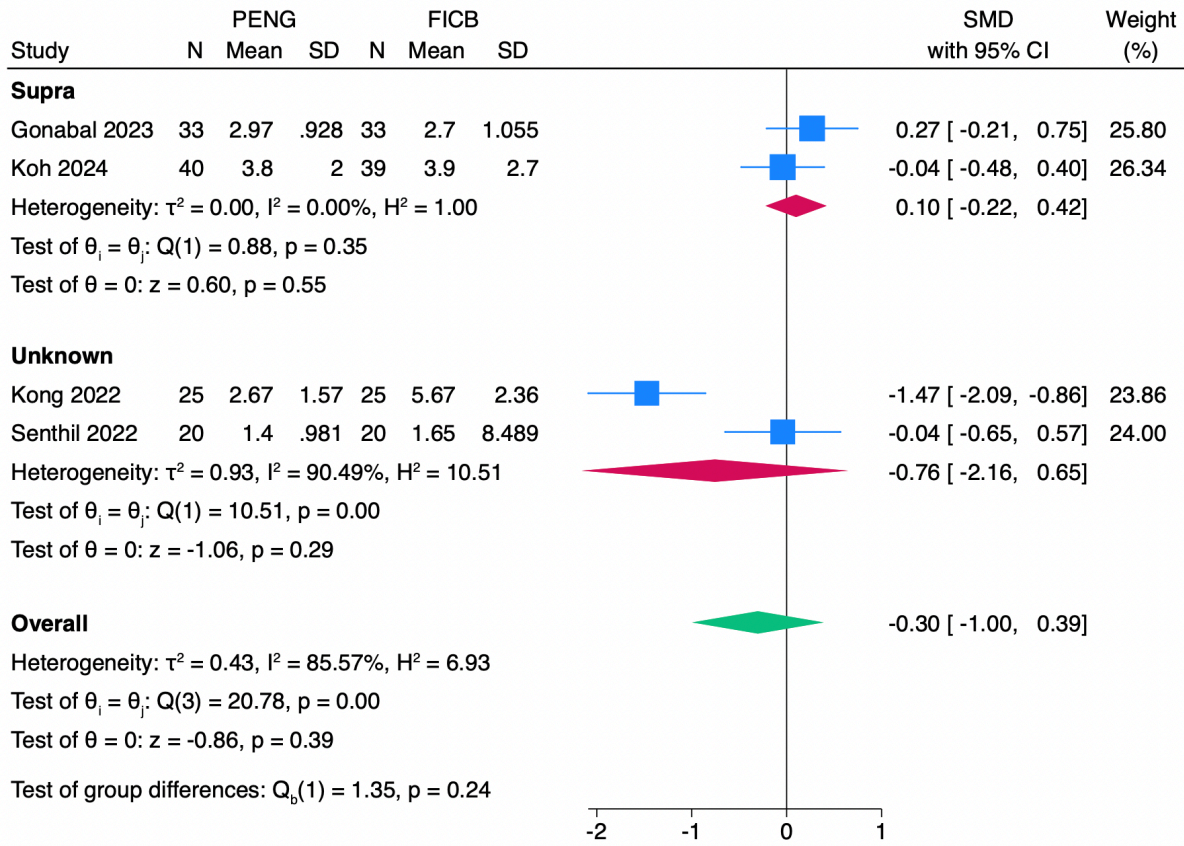
Random-effects DerSimonian–Laird model

Dynamic pain at 6 hours postoperatively - low risk of bias



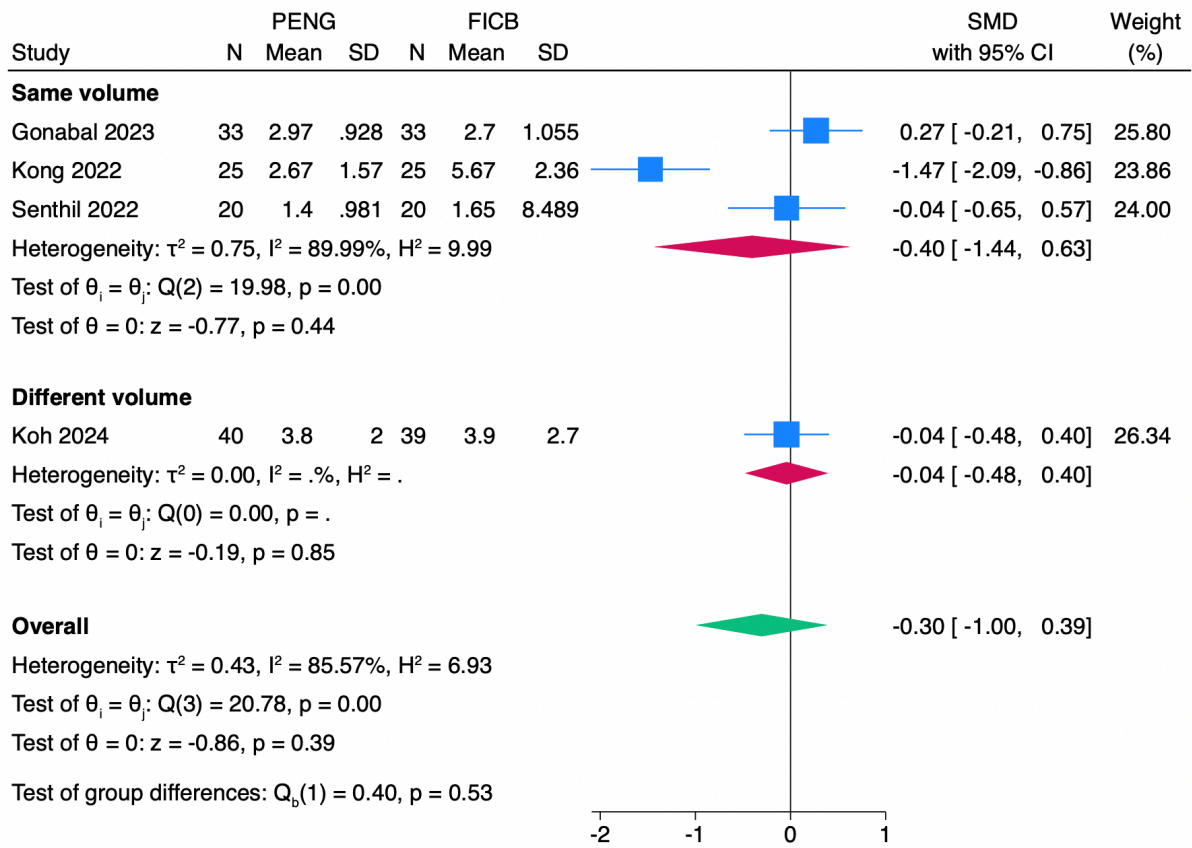
Random-effects DerSimonian–Laird model

Dynamic pain at 6 hours postoperatively - supra-inguinal approach of FICB vs infra-inguinal or unknown



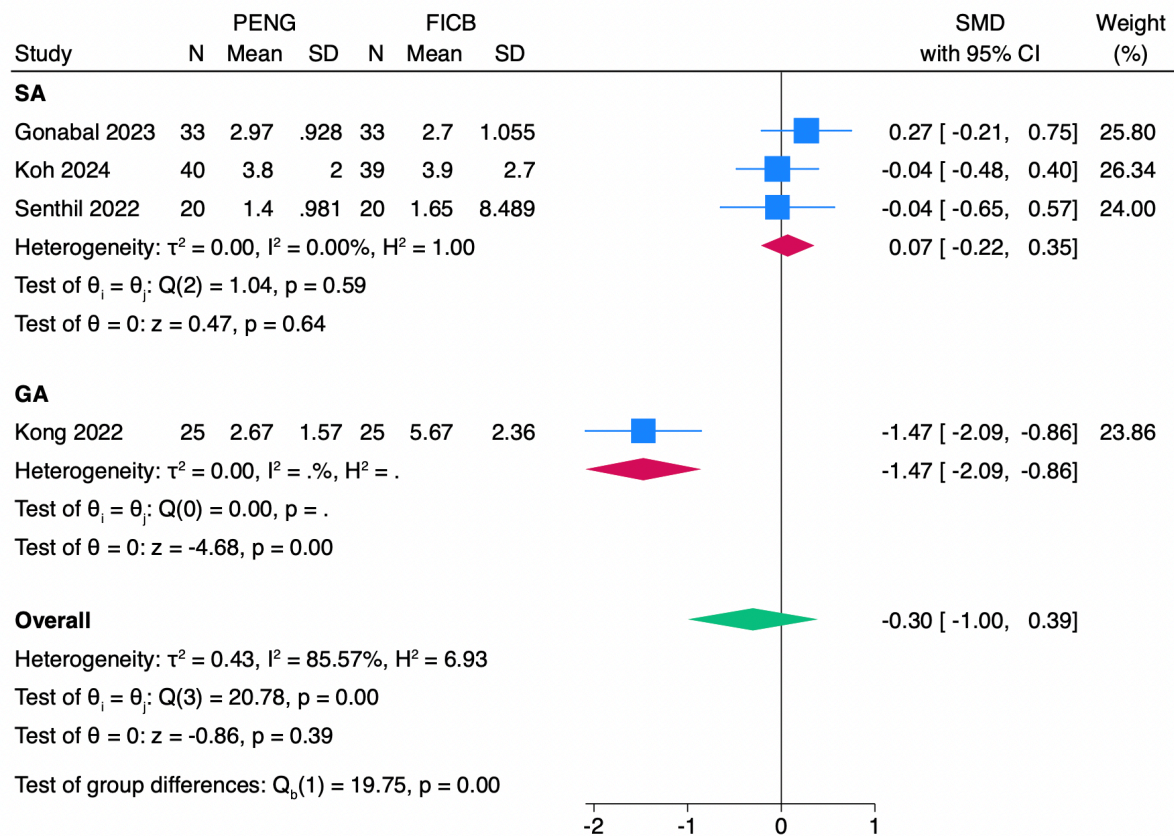
Random-effects DerSimonian–Laird model

Dynamic pain at 6 hours postoperatively - different volumes/doses of anaesthetic used in each group



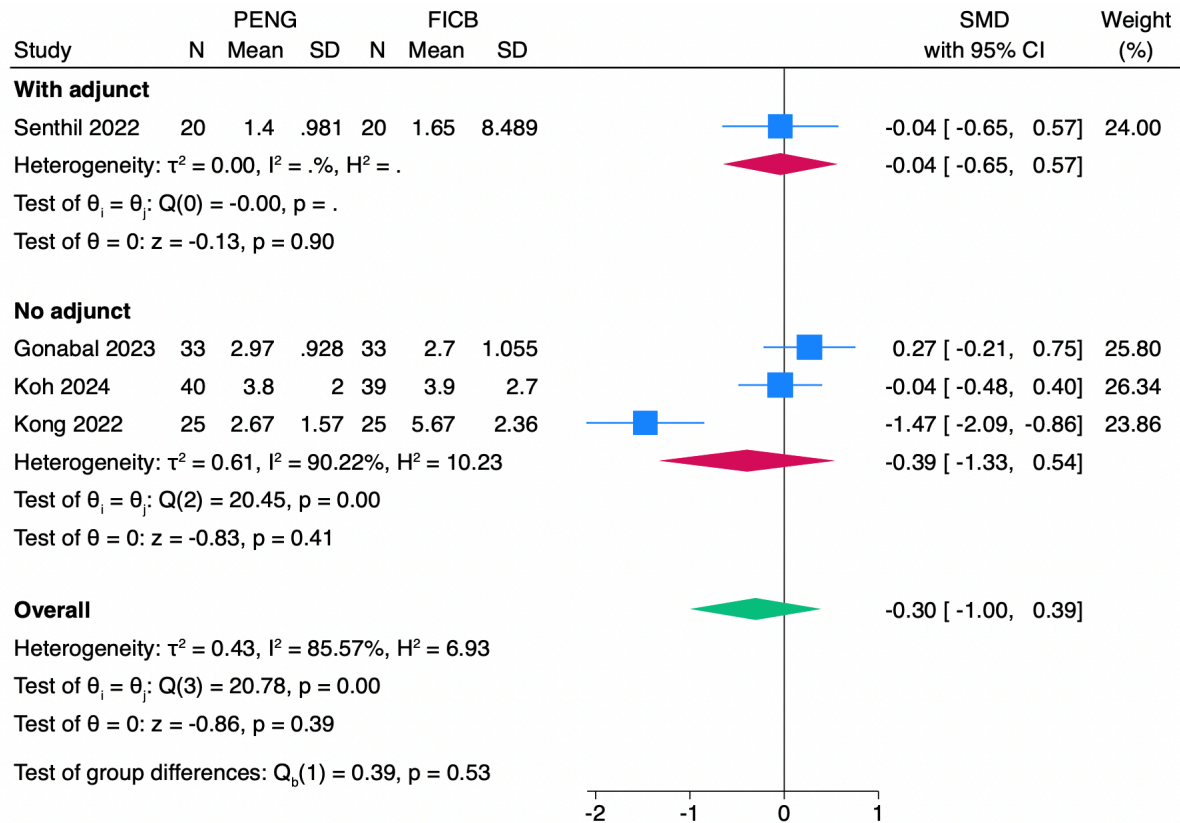
Random-effects DerSimonian–Laird model

Dynamic pain at 6 hours postoperatively - spinal or general anaesthetic



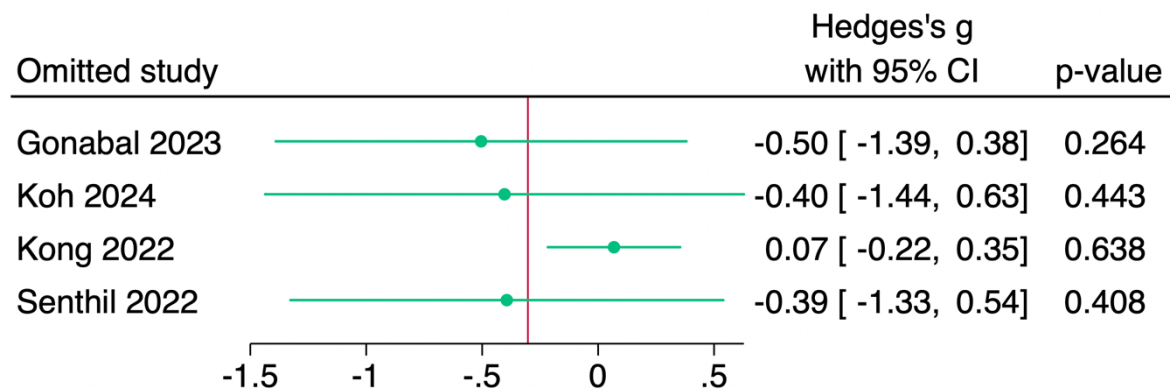
Random-effects DerSimonian–Laird model

Dynamic pain at 6 hours postoperatively - block adjunct use



Random-effects DerSimonian–Laird model

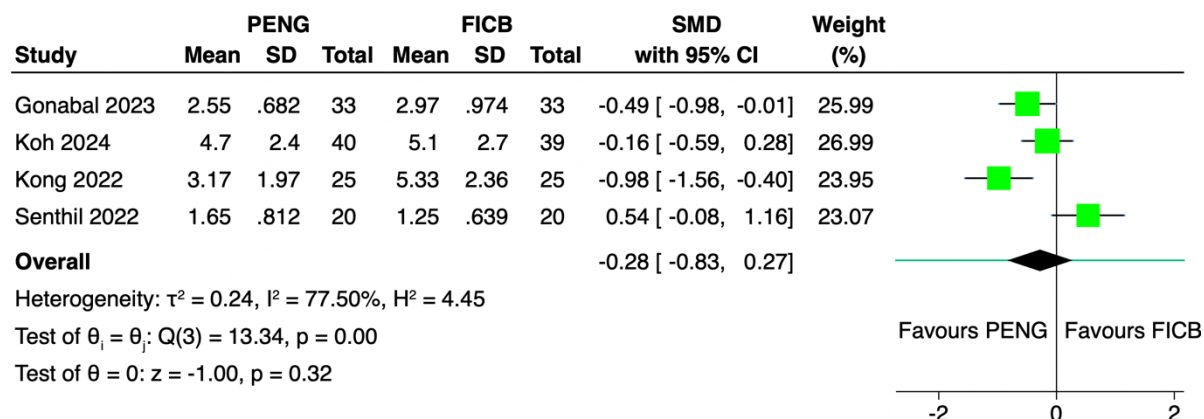
Dynamic pain at 6 hours postoperatively - leave-one-out analysis



Random-effects DerSimonian–Laird model

Dynamic pain scores at 24 hours postoperatively

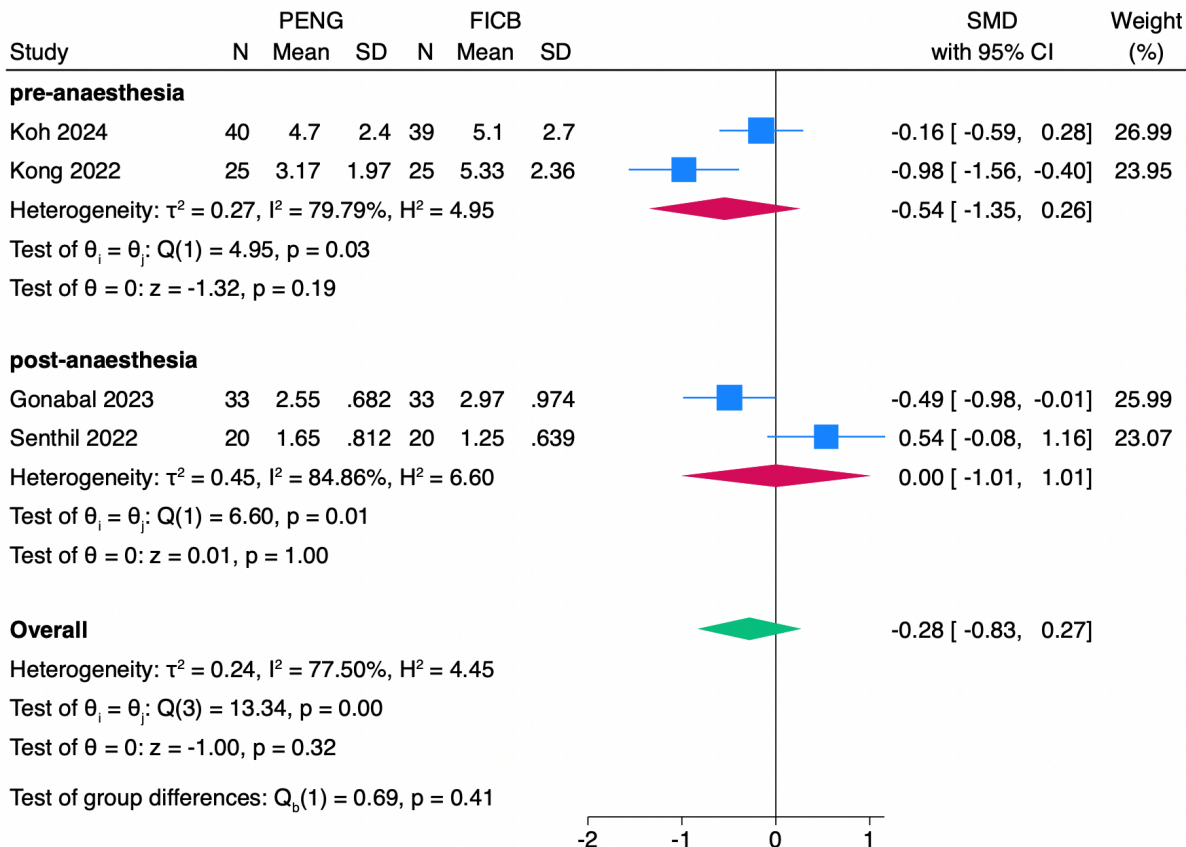
Dynamic pain scores at 24 hours postoperatively – forest plot



Random-effects DerSimonian–Laird model
 95% prediction interval

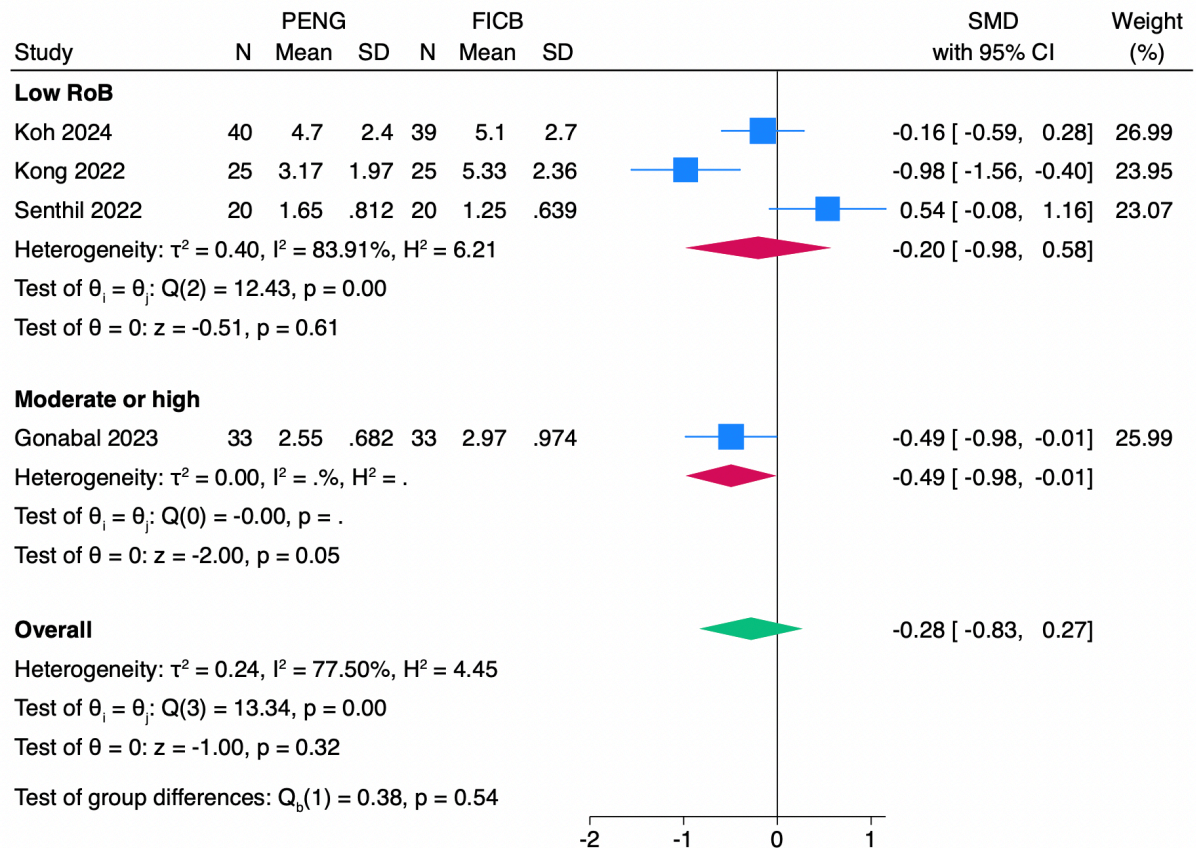
Dynamic pain scores at 24 hours postoperatively – subgroup analyses

Dynamic pain at 24 hours postoperatively - timing of administration of the block (pre- or post-anaesthesia)



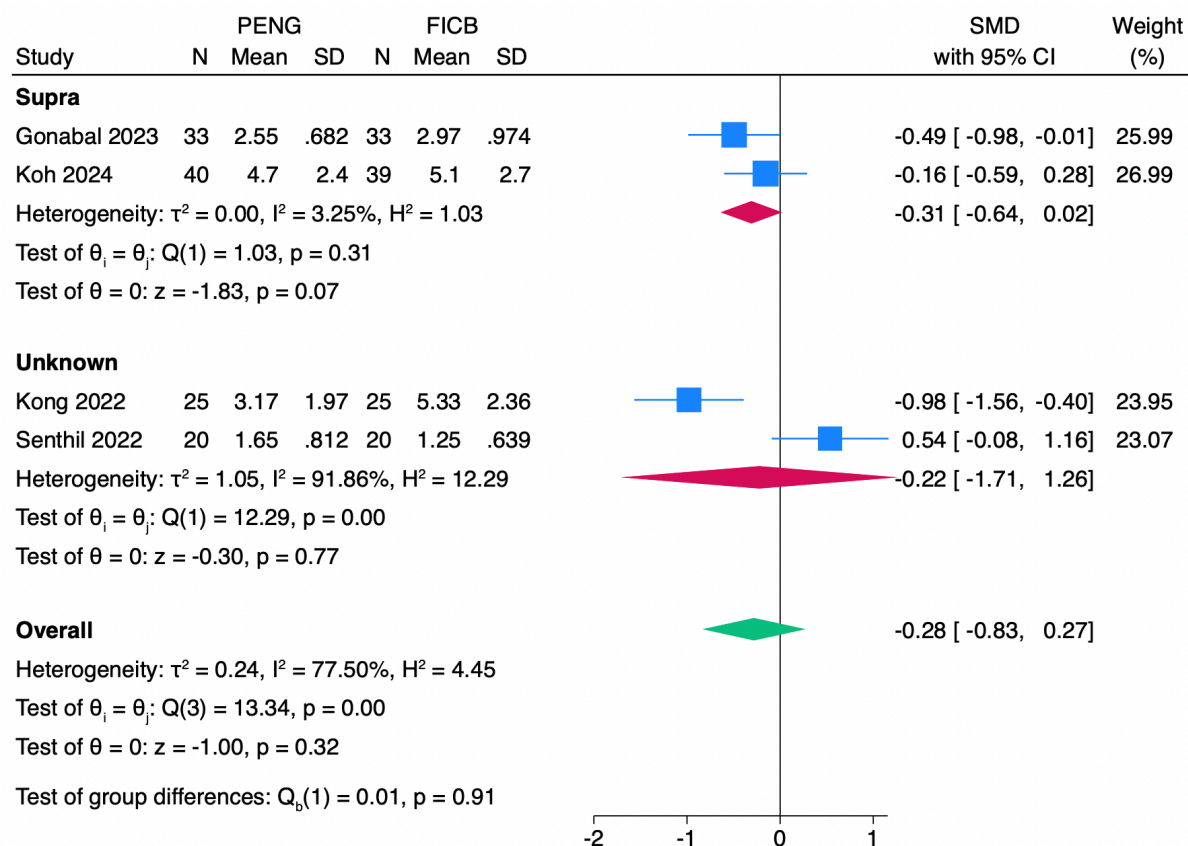
Random-effects DerSimonian–Laird model

Dynamic pain at 24 hours postoperatively - low risk of bias



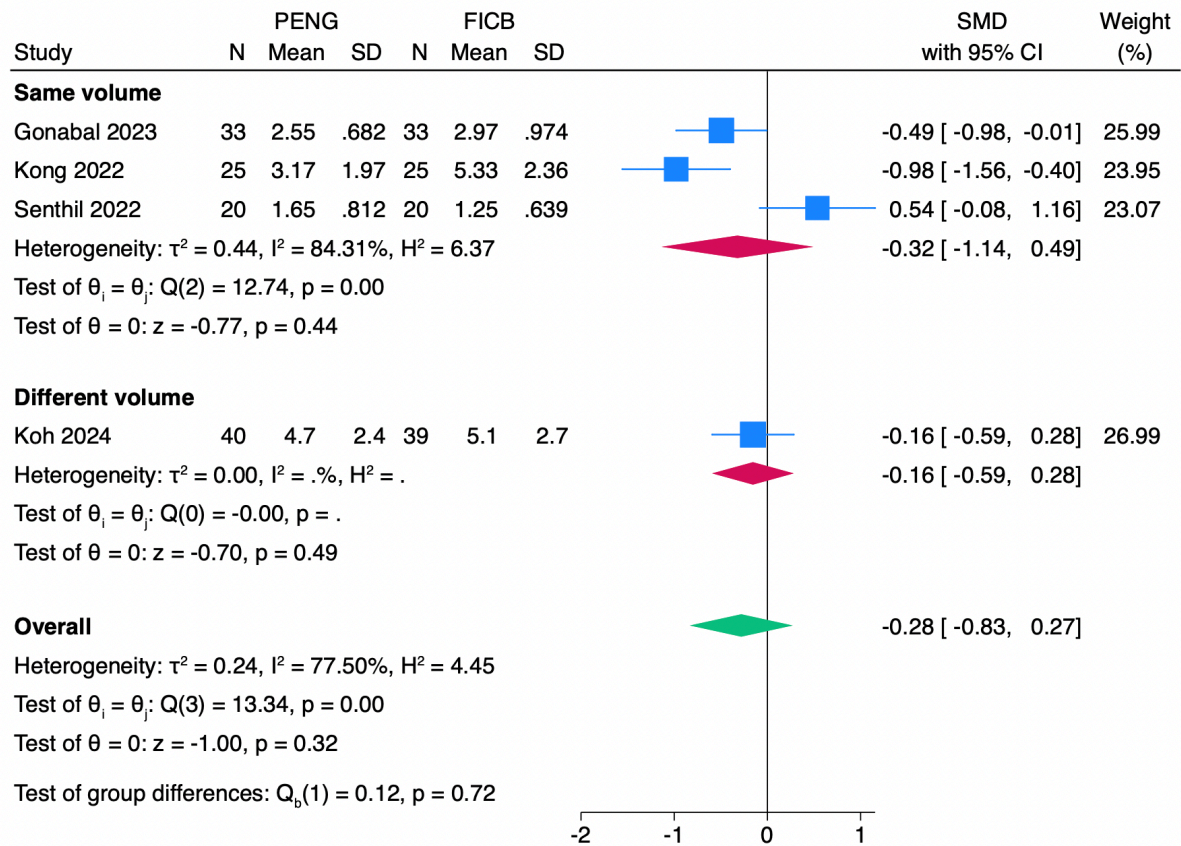
Random-effects DerSimonian-Laird model

Dynamic pain at 24 hours postoperatively - supra-inguinal approach of FICB vs infra-inguinal or unknown



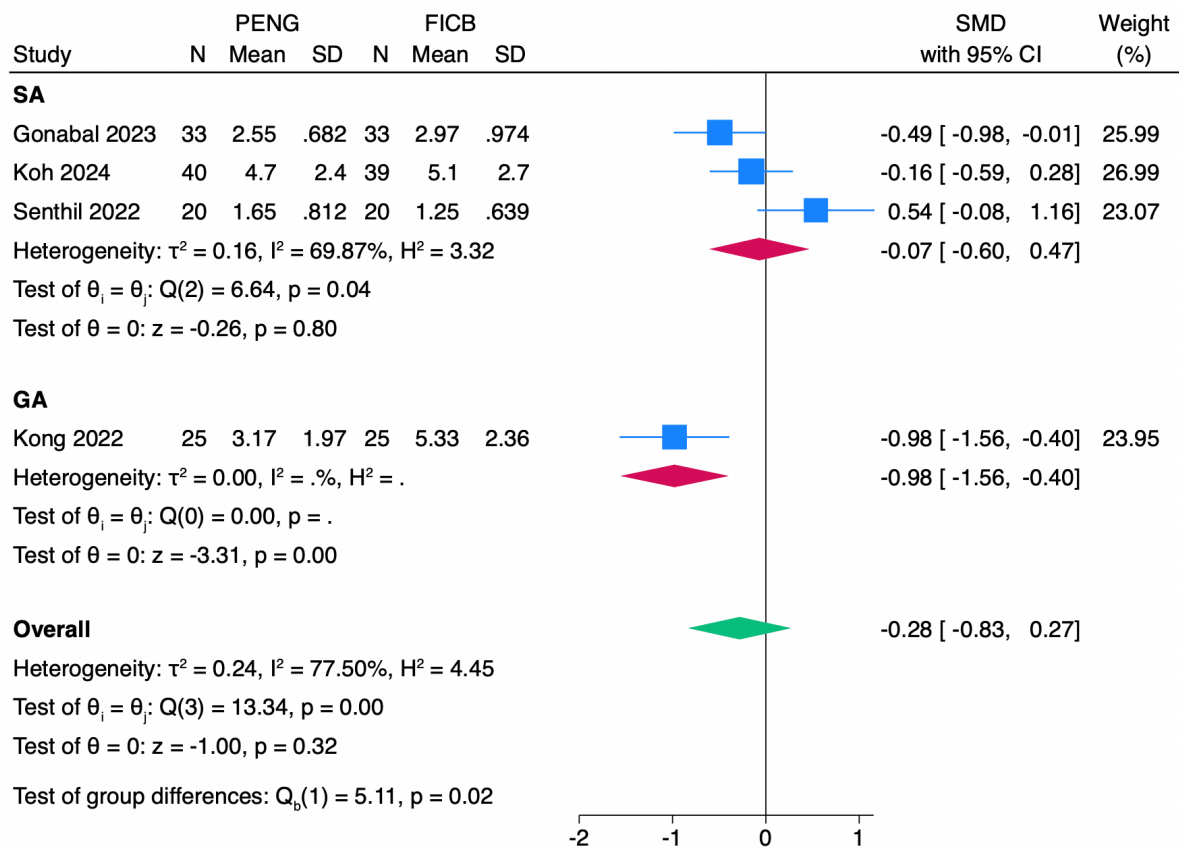
Random-effects DerSimonian–Laird model

Dynamic pain at 24 hours postoperatively - different volumes/doses of anaesthetic used in each group



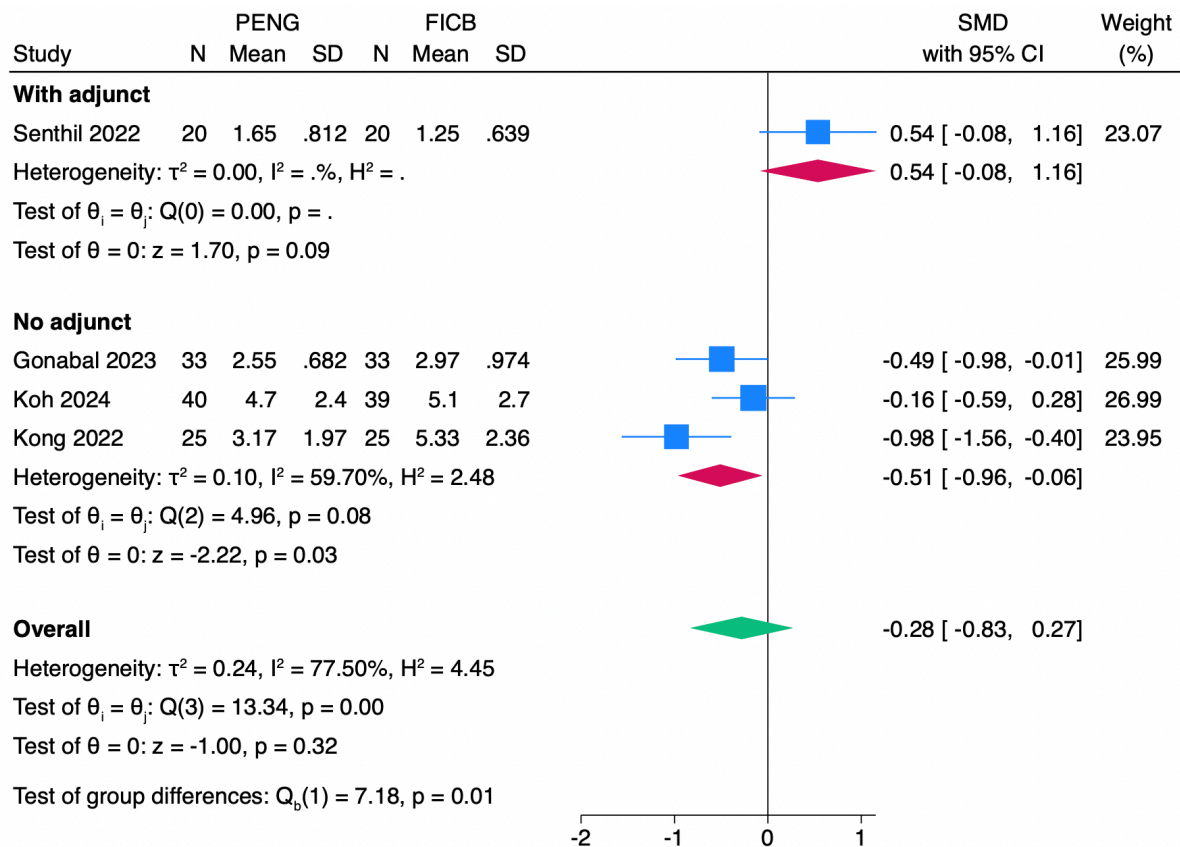
Random-effects DerSimonian–Laird model

Dynamic pain at 24 hours postoperatively - spinal or general anaesthetic



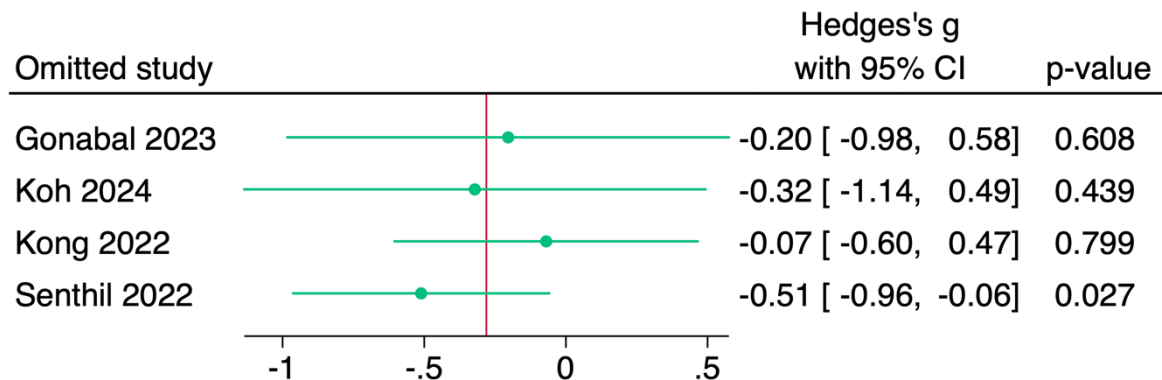
Random-effects DerSimonian–Laird model

Dynamic pain at 24 hours postoperatively - block adjunct use



Random-effects DerSimonian–Laird model

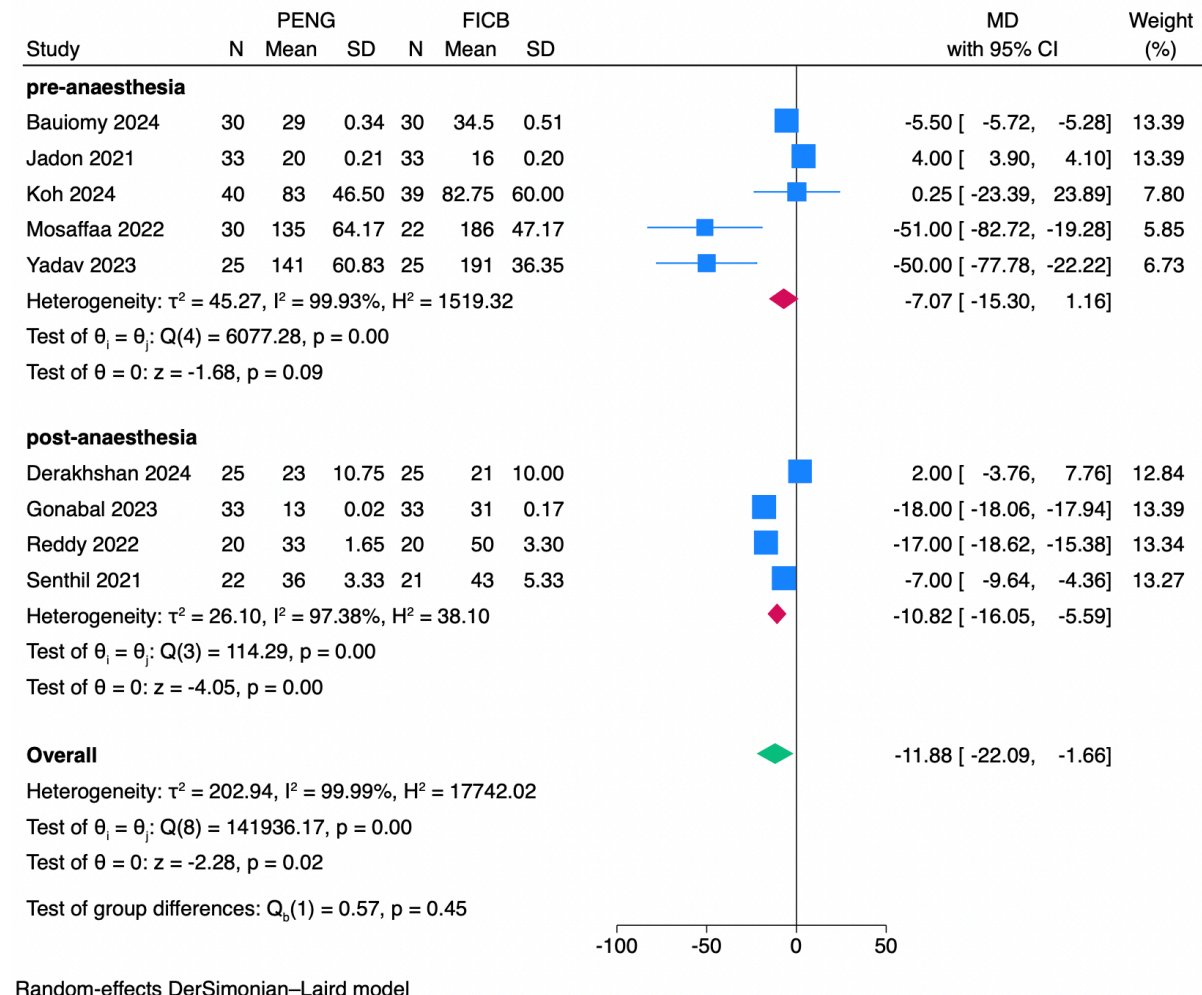
Dynamic pain at 24 hours postoperatively - leave-one-out analysis



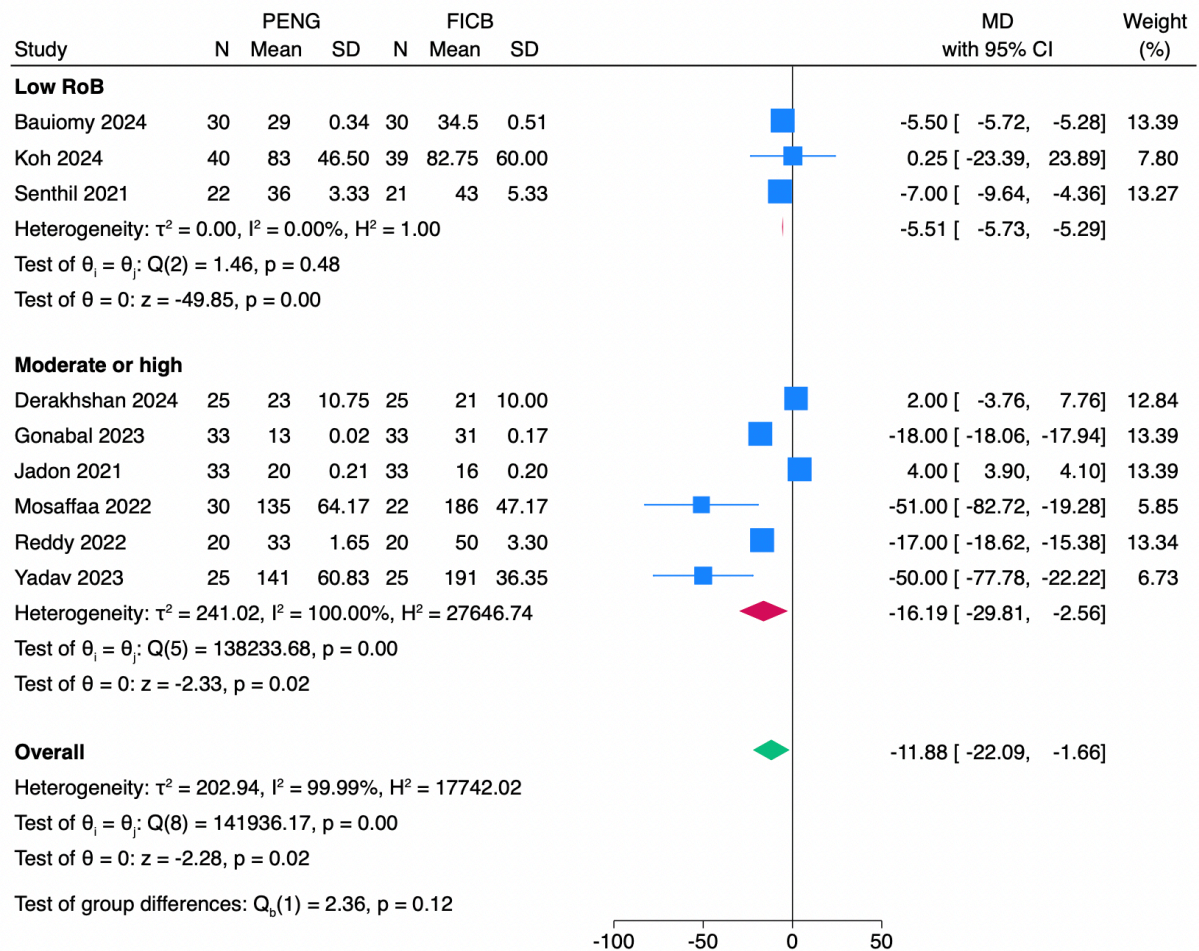
Random-effects DerSimonian–Laird model

Consumption of oral morphine equivalents (OMEs) in 24 hours postoperatively - subgroup analyses

Consumption of OMEs in 24 hours postoperatively - timing of administration of the block (pre- or post-anaesthesia)

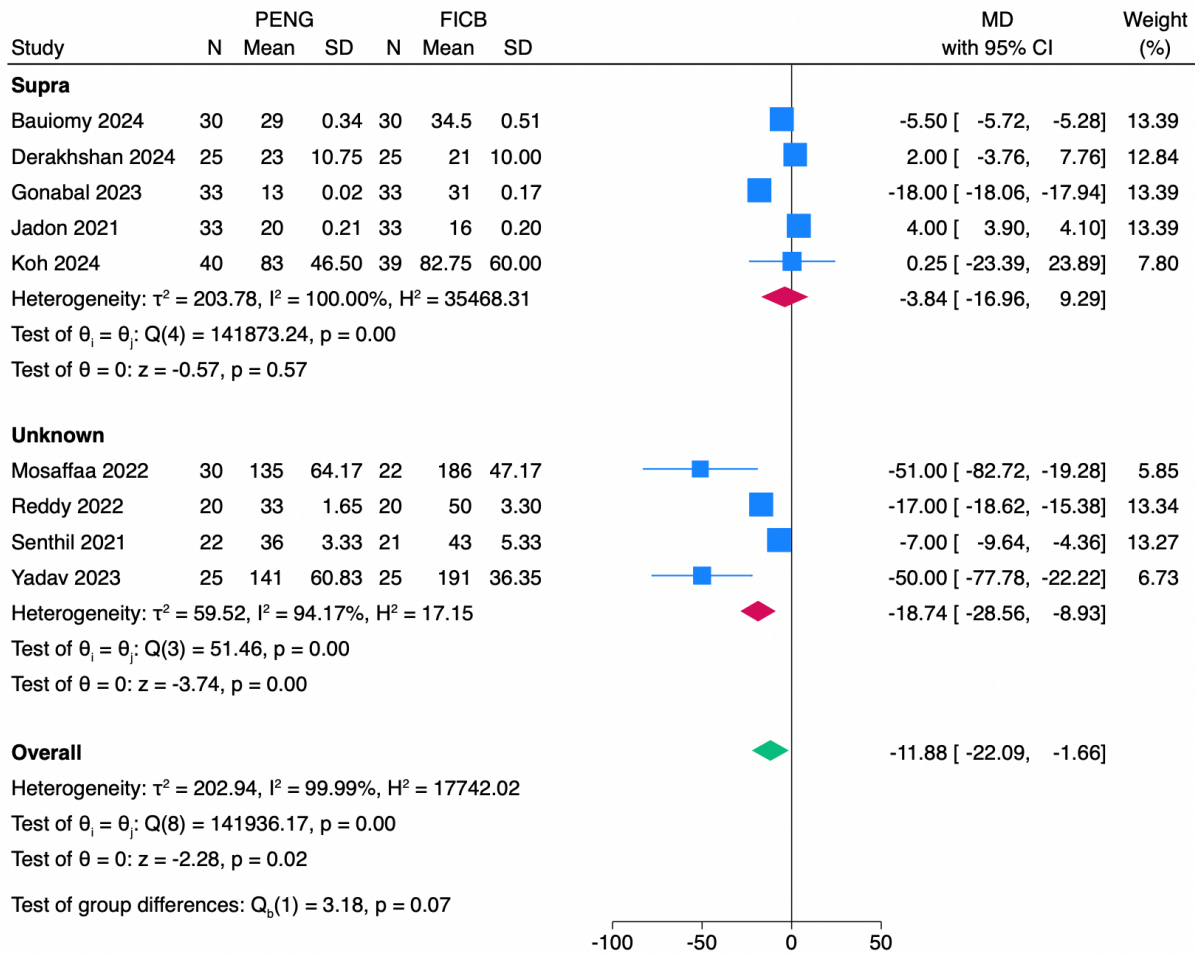


Consumption of OMEs in 24 hours postoperatively - low risk of bias



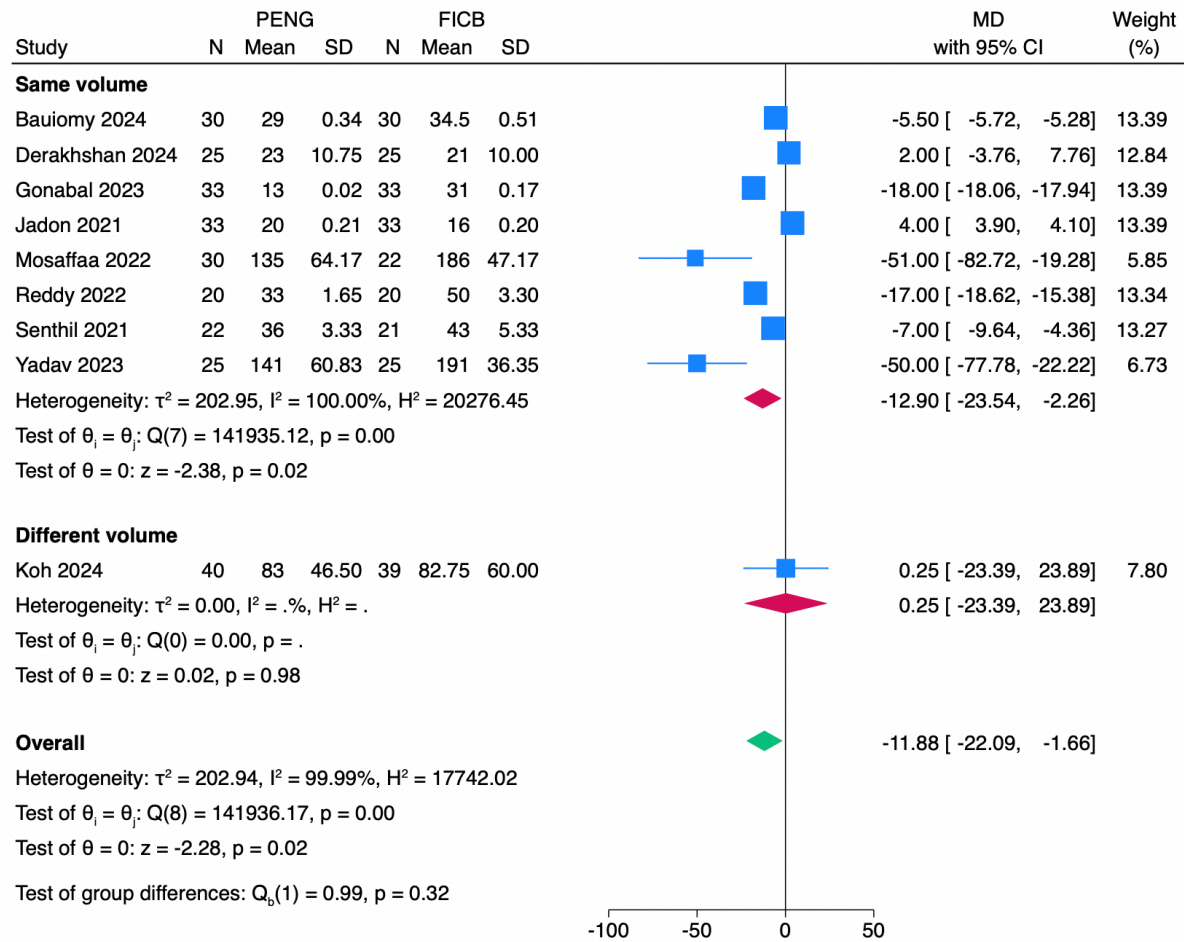
Random-effects DerSimonian–Laird model

Consumption of OMEs in 24 hours postoperatively - supra-inguinal approach of FICB vs infra-inguinal or unknown



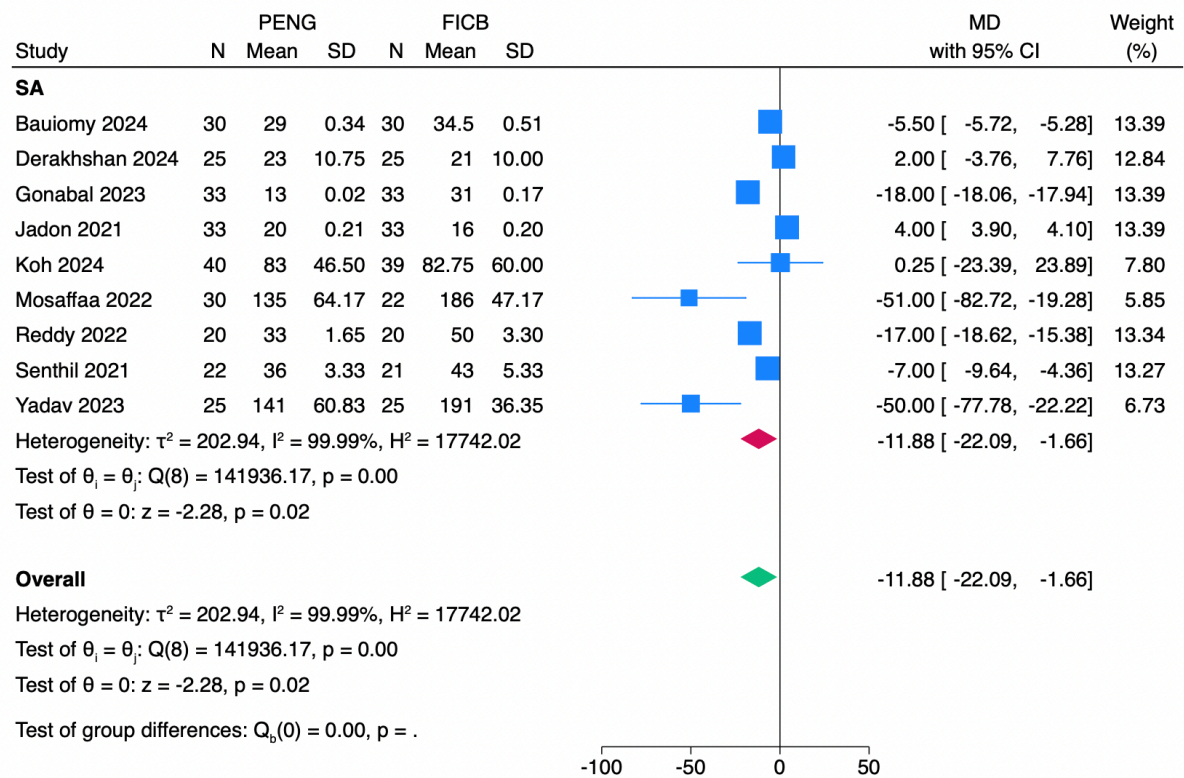
Random-effects DerSimonian-Laird model

Consumption of OMEs in 24 hours postoperatively - different volumes/doses of anaesthetic used in each group



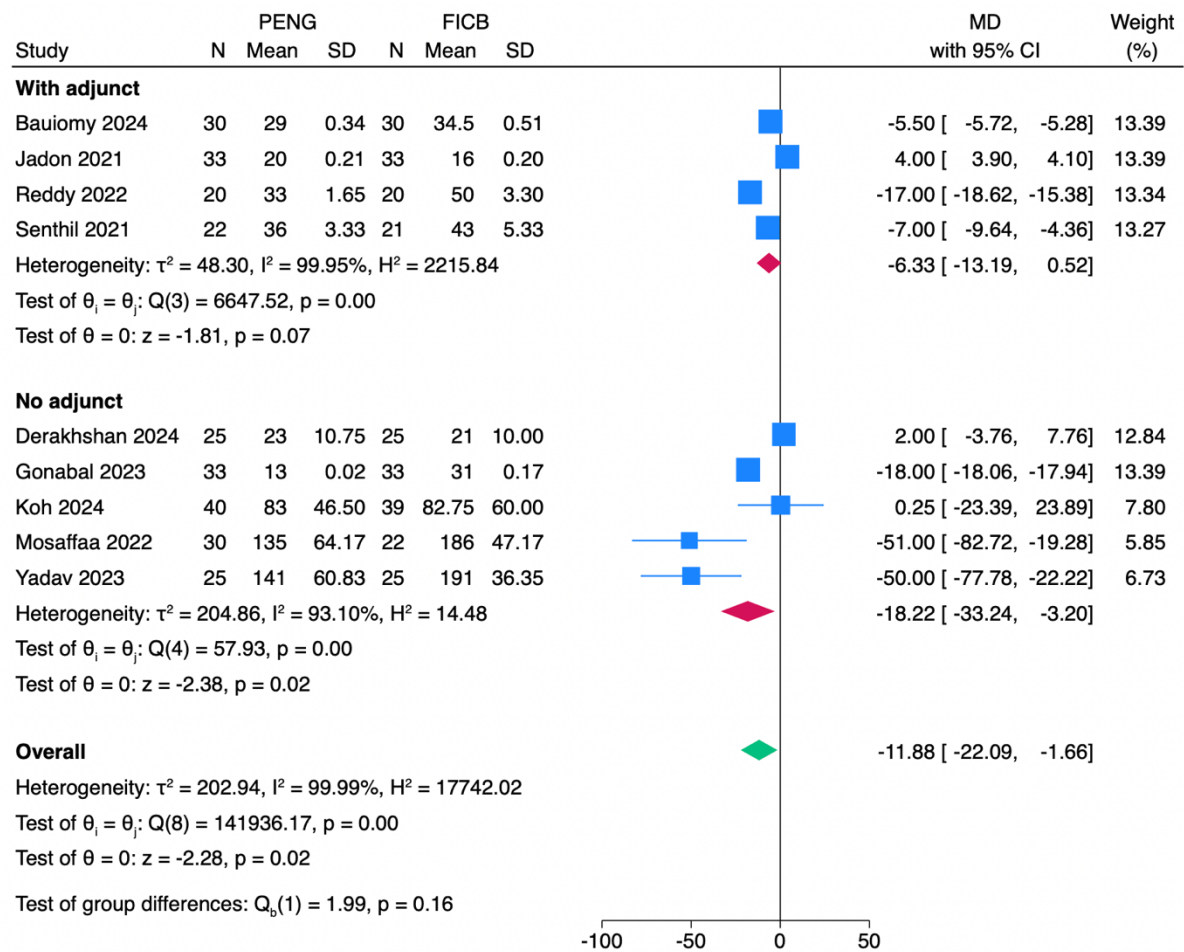
Random-effects DerSimonian-Laird model

Consumption of OMEs in 24 hours postoperatively - spinal or general anaesthetic

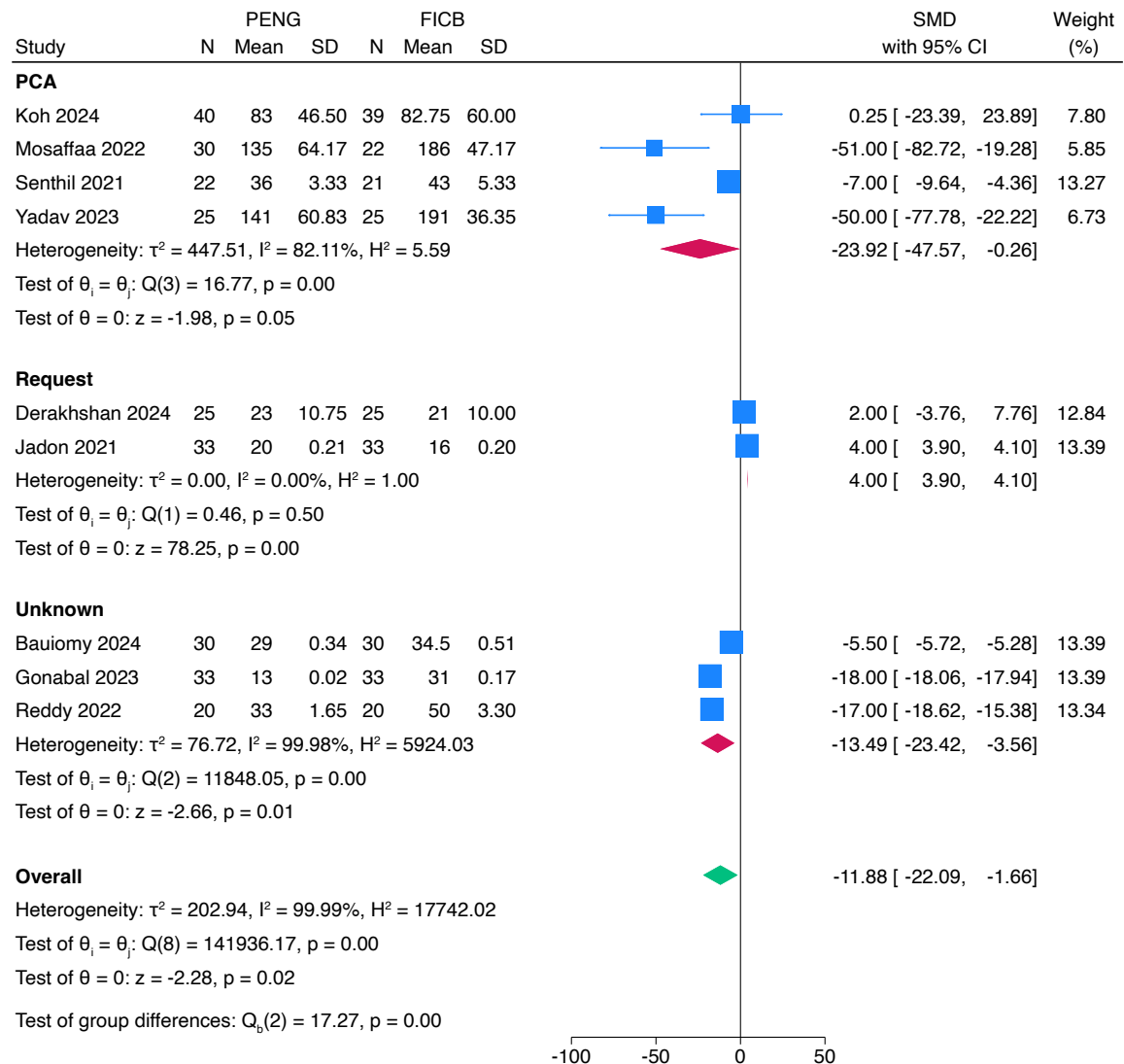


Random-effects DerSimonian–Laird model

Consumption of OMEs in 24 hours postoperatively - block adjunct use

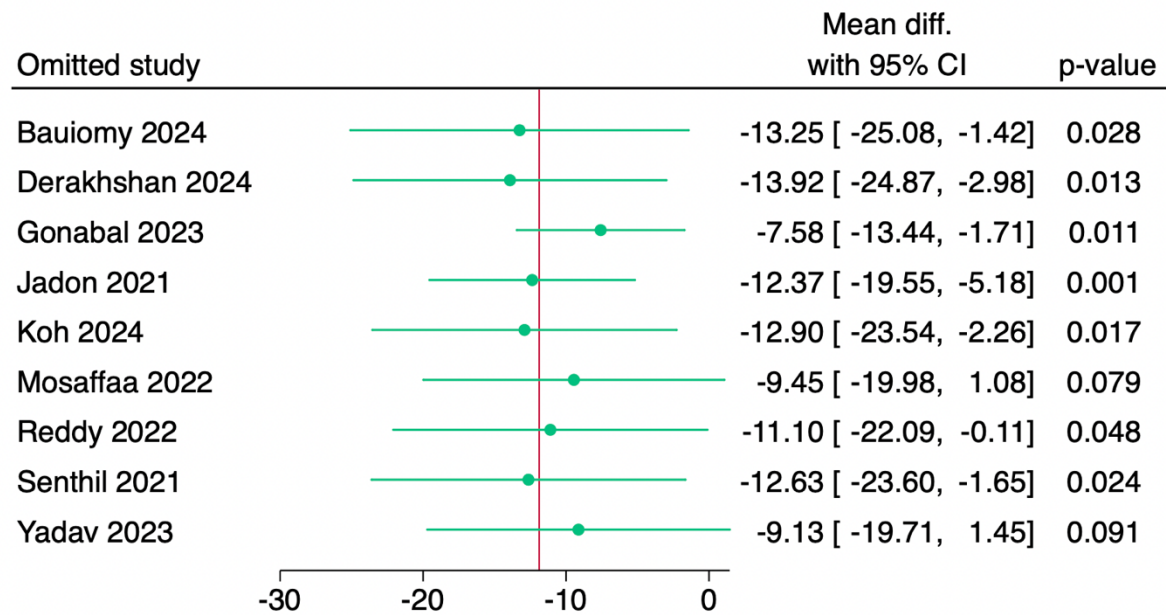


Consumption of OMEs in 24 hours postoperatively - patient-controlled analgesia (PCA) pump use



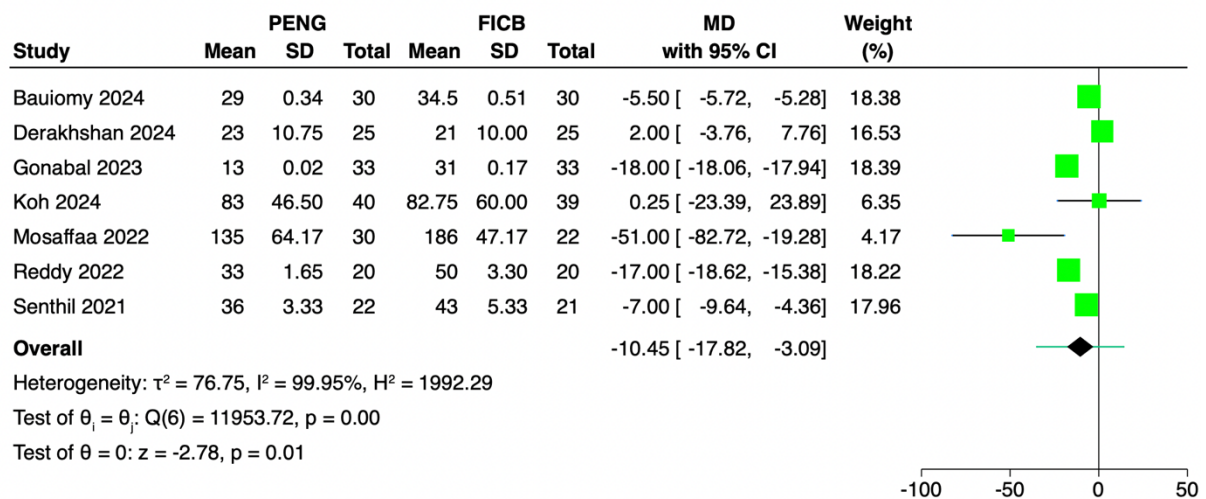
Random-effects DerSimonian-Laird model

Consumption of OMEs in 24 hours postoperatively - leave-one-out analysis



Random-effects DerSimonian–Laird model

Consumption of OMEs in 24 hours postoperatively - outlier analysis



Random-effects DerSimonian–Laird model
 95% prediction interval

Table of Drug Conversions to Oral Morphine Equivalents (OMEs)

Conversion factors to OME:

- Tramadol IV: 0.25
- Morphine IV: 2.5
- Fentanyl: 0.165

Study ID (Author, Year)	Reported opioid metric	Drug(s) reported	Route(s) reported	Intervention 1 formula to convert	Intervention 2 formula to convert	Intervention 1 mean OME in 24h	Intervention 2 mean OME in 24h	Assumptions made? (Y/N, details)	Imputed? (Y/N, details)	Included in main analysis? (Y/N)
Baulomy et al, 2024	Number of tramadol doses (24h)	1 dose = 50mg IV tramadol	IV	$(2.3 \times 50) \times 0.25$	$(2.7 \times 50) \times 0.25$	29mg	34mg	N	N	Y
Chaudhary et al, 2023	Duration of analgesia consumption	Not reported	IV	N/A	N/A	N/A		N/A	N	N, paper did not report the post operative analgesia received. Only reported the mean duration that post operative analgesia was required
Cui et al, 2024	Number of parecoxib sodium and sufentanil doses (24h)	1 dose = 40mg parecoxib 1.5 µg/L sufentanil	IV & PCA	N/A	N/A	N/A		N/A	N	N, paper reported "opioid time", given the sufentanil was provided via PCA, there was no reasonable way to impute or assume how many doses were received over the reported time
Derakshan et al, 2024	Total morphine consumption (24h)	IV morphine	IV	9.2×2.5	8.3×2.5	23mg	21mg	N	N	Y
Gonobal et al, 2024	Total opioid consumption (24h)	1 dose = 1 mg/kg tramadol	IV	$(5 \div 0.1) \times 0.25$	$(12.5 \div 0.1) \times 0.25$	13mg	31mg	N	Y, paper reported outcome as morphine equivalents (ME) and drug used was IV tramadol converted by a factor of 0.1. We reversed the calculation to gather the mean tramadol dose and applied the cited OME calculation we have used in this case to a factor of 0.165.	Y
Jadon et al, 2021	Number of tramadol doses (24h)	1 dose = 50mg tramadol	IV	$(1.6 \times 50) \times 0.25$	$(1.3 \times 50) \times 0.25$	20mg	16mg	N	N	Y
Kadlimatti et al, 2024	Number of tramadol doses (24h)	1 dose = 1 mg/kg tramadol	IV	N/A	N/A	N/A		N/A	N	N, in order to analyse the reported outcome, average weight and average dose would have to be used to calculate the received dose.
Keskes et al, 2023	Mean morphine consumption in post operative monitoring room (2h)	mg of morphine in 2 hours	IV	N/A	N/A	N/A		N/A	N	N, outcome of this paper relating to analgesic consumption is only during the 2h postoperative period thus not comparable. It would not be appropriate to extrapolate the data to a 24h period
Koh et al, 2024	IV morphine equivalents (24h)	not reported	IV & PCA	N/A	N/A	N/A	N/A	N/A	N	N, outcome reported using morphine equivalents (ME), the factor and drug deriving this are not given
Kong et al, 2022	Total dose of fentanyl (24h)	fentanyl in mcg / 24 hours	PCA	N/A	N/A	N/A		N/A	N	N, data relating to this outcome was given using median / interquartile range. Unable to determine mean without estimation
Lin et al, 2024	Total dose in "morphine equivalents" (24h)	Not reported	Not reported	N/A	N/A	N/A	N/A	N/A	N	N, outcome was reported as morphine equivalents in 24h but no information given as to what constituted that calculation (e.g. drug, dose and formula). Unable to assume equivalence with included outcomes
Manohara et al, 2021	Total dose of oxycodone (24h)	oxycodone (oxynorm)	Not reported	N/A	N/A	N/A	N/A	N/A	N	N, route of oxycodone not reported thus unable to calculate OME
Mosaffa et al, 2022	Number of morphine doses (24h)	1 dose via PCA = 1mg morphine, 1 dose via IV = 2mg morphine	IV & PCA	54×2.5	74.37×2.5	135mg	186mg	Y, Assumed unit of morphine given was in milligrams (mg) aligning to standard practice	N	Y
Natjaran et al, 2021	Number of paracetamol doses (24h)	1 dose = 1g paracetamol	IV	N/A	N/A	N/A	N/A	N/A	N	N, accepted formulae does not apply to calculation of paracetamol to OME
Reddy et al, 2022	Total fentanyl consumption (24h)	fentanyl in mcg / 24 hours	IV	200×0.165	300×0.165	33mg	50mg	Y, Fentanyl was given IV, this is not explicitly stated but in-keeping with usual practice	N	Y
Saini et al, 2024	Total tramadol and paracetamol consumption	paracetamol 1g, tramadol 50-100mg	IV & PCA	N/A		N/A		N	N	N, accepted formulae is not approved for calculation of paracetamol to OME. Paracetamol use is reported as given unless contraindicated, no report is made as to whether there were any contraindications. Some patients therefore may have received no paracetamol and only PCA tramadol. There is no reliable way to impute.
Senthil et al, 2021	Total fentanyl consumption (24h)	fentanyl in mcg / 24 hours	PCA	213×0.165	255×0.165	36mg	43mg	Y, Fentanyl was given IV, this is not explicitly stated but in-keeping with usual practice	N	Y
Shankar et al, 2020	Total tramadol consumption (24h)	1 dose = 1mg/kg	IV	N/A		N/A		N	N	N, in order to analyse the reported outcome, average weight and average dose would have to be used to calculate the received dose.
Yadav et al, 2023	Total morphine consumption (24h)	1 dose via PCA = 1mg morphine, 1 dose via IV = 2mg morphine	IV & PCA	56.36×2.5	76.23×2.5	141mg	191mg	N	N	Y