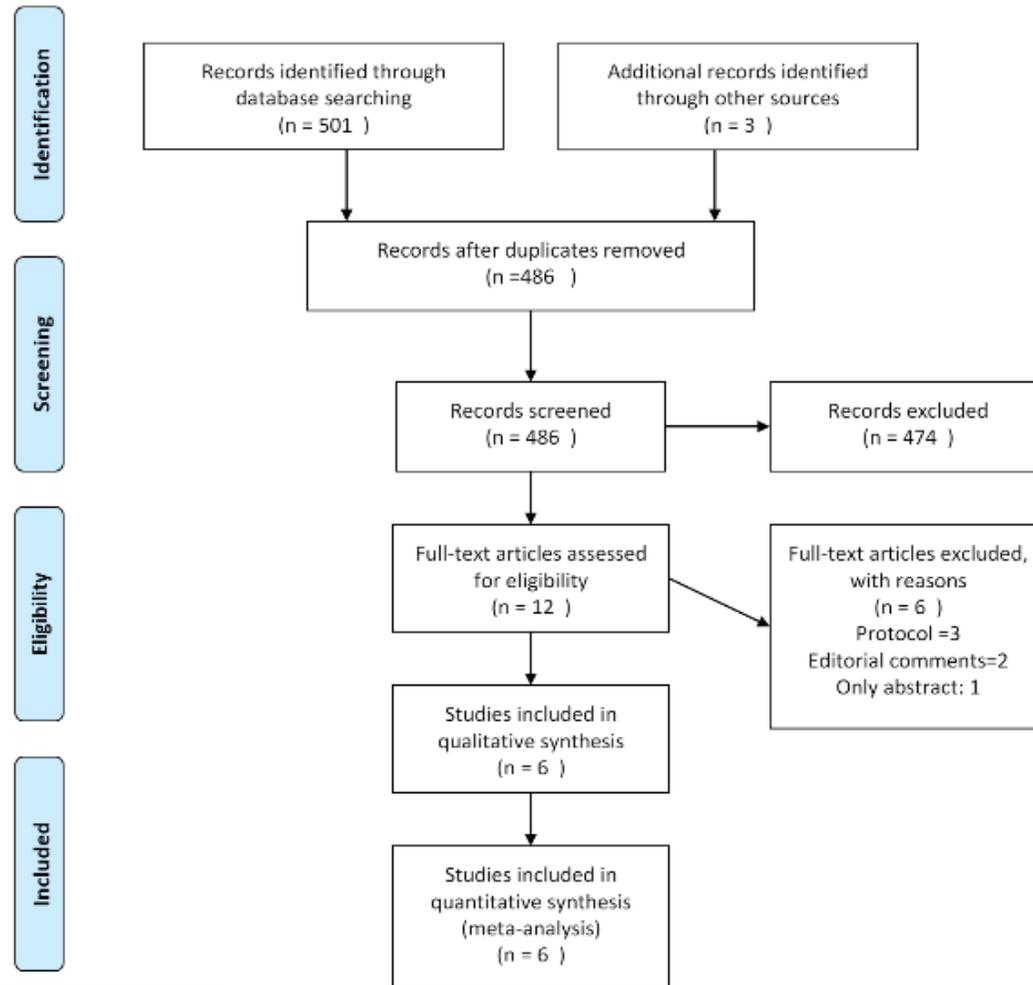


Supplementary Table 1: Summary of included studies

Studies	Country	Participants and their inclusion criteria	Intervention	Comparator	
			Name	Name	Dose
Bogani 2014 (2)	Italy	age \geq 18 years old, available information about pain perception at each time scheduled, presence of uterine cervix	Forced coughing	Local anesthesia	1.0–2.0 mL of 1% lidocaine
Goldstein akavia 2018 (17)	Israel	aged 21–65, underwent colposcopically guided cervical punch biopsy	Forced coughing	no pain management	
Karaman 2019 (20)	Turkey	Presence of abnormal cervical cytology requiring a colposcopy, an age \geq 18 years old, the presence of cervix, and the patients being able to give information on their perceived pain	Forced coughing	Vemcaine 10% pump spray	
Kuhn 2020 (18)	USA	Age \geq 18 years, not pregnant, not diagnosed with anal, vulvar, or vaginal intraepithelial neoplasia, able to understand a written informed consent document	Forced coughing	no pain management	

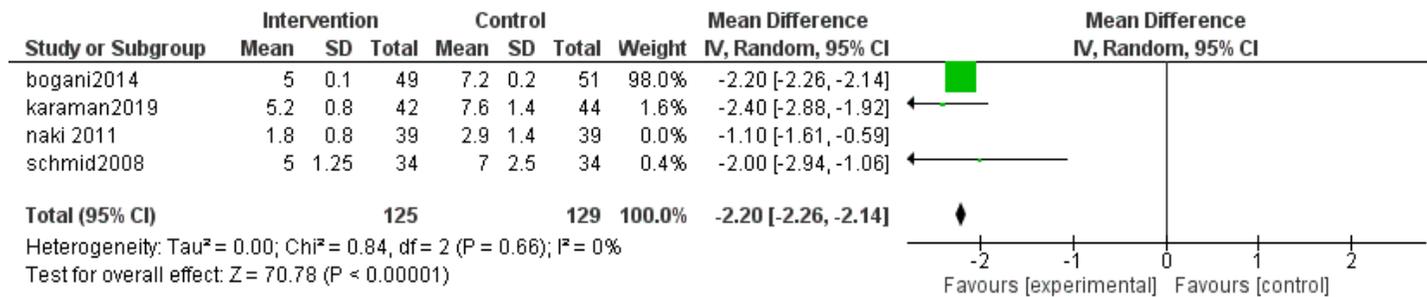
Naki 2011 (5)	Turkey	women aged 18–65 years, abnormal Pap smear test results at a gynecologic oncology outpatient clinic	Forced coughing	local anesthesia or no pain management	1.0 ml 1% lidocaine
schmid2008 (21)	Vienna	Patients' ages ranged from 18-66 years with a median of 34 years. Without allergies to lidocaine, no pregnancy, and able to read and speak German	Forced coughing	local anesthesia	0.5 mL1% lidocaine



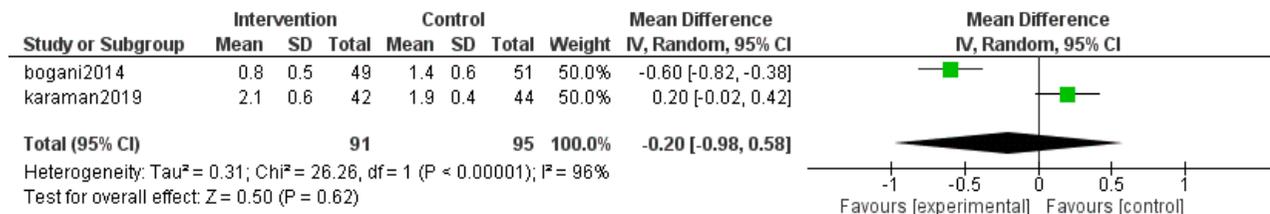
Supplementary Fig.1: Prisma flow Diagram

	Randomization process	deviations from intended interventions	Bias in measurement of the outcome	Bias due to missing outcome data	Bias in selection of the reported result
bogani2014	-	-	?	+	-
goldsteinakavia2018	-	-	-	+	+
karaman2019	+	-	-	+	+
kuhn2020	-	-	-	+	+
naki2011	?	-	-	+	+
schmid2008	?	-	-	+	-

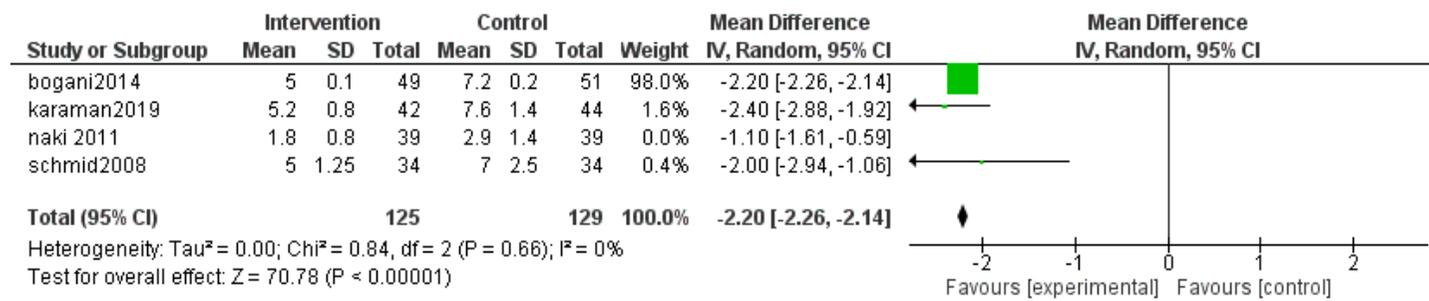
Supplementary Fig.2: Risk of bias summary



Supplementary Fig.3: Duration of the cervical biopsy in the forced coughing group compared with LA and no pain management group respectively after removing heterogeneity.



Supplementary Fig.4: Overall VAS pain Five minutes after the procedure in the forced coughing group compared with LA and no pain management group respectively.



Supplementary Fig.5: Duration of the cervical biopsy in the forced coughing group compared with LA and no pain management group respectively after removing heterogeneity.