

Supplementary Table 1. Databases searched and articles retrieved

Database	Keywords	Studies found
PubMed	("Venipuncture"[Mesh] OR "Phlebotomy"[Mesh] OR "Injections"[Mesh] OR "Catheterization, Peripheral"[Mesh] OR "Needles"[Mesh] OR venipuncture[tiab] OR venepuncture[tiab] OR phlebotomy[tiab] OR injection*[tiab] OR needle*[tiab] OR "intravenous cannulation"[tiab] OR "IV insertion"[tiab] OR "vascular access"[tiab] OR "blood draw"[tiab] OR "needle-related procedure*[tiab]) AND ("Virtual Reality"[Mesh] OR "virtual reality"[tiab] OR VR[tiab] OR "virtual environment*[tiab] OR "immersive technolog*[tiab] OR "head-mounted display*[tiab]) AND ("Pain"[Mesh] OR "Anxiety"[Mesh] OR pain[tiab] OR anxiety[tiab] OR fear[tiab] OR distress[tiab]) AND ("Child"[Mesh] OR "Infant"[Mesh] OR "Adolescent"[Mesh] OR "Pediatrics"[Mesh] OR child*[tiab] OR pediatric*[tiab] OR paediatric*[tiab] OR infant*[tiab] OR adolescent*[tiab]) AND ("Systematic Review"[Publication Type] OR "Meta-Analysis"[Publication Type] OR "systematic review"[tiab] OR "meta-analysis"[tiab] OR "meta analysis"[tiab] OR "pooled analysis"[tiab])	31
Web of Science	meta-analysis needle virtual reality VR	112
Embase	('venipuncture'/exp OR 'phlebotomy'/exp OR 'injection'/exp OR 'peripheral catheterization'/exp OR 'needle'/exp OR venipuncture:ti,ab OR venepuncture:ti,ab OR phlebotomy:ti,ab OR injection*:ti,ab OR needle*:ti,ab OR 'intravenous cannulation':ti,ab OR 'iv insertion':ti,ab OR 'vascular access':ti,ab OR 'blood draw':ti,ab OR 'needle-related procedure*':ti,ab) AND ('virtual reality'/exp OR 'virtual reality':ti,ab OR vr:ti,ab OR 'virtual environment*':ti,ab OR 'immersive technolog*':ti,ab OR 'head-mounted display*':ti,ab) AND ('pain'/exp OR 'anxiety'/exp OR pain:ti,ab OR anxiety:ti,ab OR fear:ti,ab OR distress:ti,ab) AND ('child'/exp OR 'infant'/exp OR 'adolescent'/exp OR 'pediatrics'/exp OR child*:ti,ab OR pediatric*:ti,ab OR paediatric*:ti,ab OR infant*:ti,ab OR adolescent*:ti,ab) AND ('systematic review'/exp OR 'meta analysis'/exp OR 'systematic review':ti,ab OR 'meta-analysis':ti,ab OR 'meta analysis':ti,ab OR 'pooled analysis':ti,ab)	52
Cochrane	(venipuncture OR venepuncture OR phlebotomy OR "intravenous cannulation" OR "vascular access" OR needle*)AND(immunization OR vaccination)AND("procedural pain" OR anxiety)AND(distraction OR "virtual reality" OR VR)AND(children OR child* OR pediatric* OR paediatric*)	4
ScienceDirect	meta-analysis needle virtual reality VR children pediatric paediatric procedural pain distraction systematic analysis	72
	Total	271