

## Supplementary file-1: Search Strategy Details

### PubMed Central Search Strategy

("hot temperature/therapeutic use"[MeSH Terms] OR "hot temperature/therapy"[MeSH Terms]) AND ("labor s"[All Fields] OR "labored"[All Fields] OR "laborer"[All Fields] OR "laborer s"[All Fields] OR "laborers"[All Fields] OR "laboring"[All Fields] OR "labors"[All Fields] OR "labour"[All Fields] OR "work"[MeSH Terms] OR "work"[All Fields] OR "labor"[All Fields] OR "labor, obstetric"[MeSH Terms] OR ("labor"[All Fields] AND "obstetric"[All Fields]) OR "obstetric labor"[All Fields] OR "laboured"[All Fields] OR "labourer"[All Fields] OR "labourers"[All Fields] OR "labouring"[All Fields] OR "labours"[All Fields]) ("hot temperature/therapeutic use"[MeSH Terms] OR "hot temperature/therapy"[MeSH Terms]) AND "Uterine Contraction"[MeSH Terms] "hyperthermia, induced"[MeSH Terms] AND "Apgar Score"[MeSH Terms] "Steam Bath"[MeSH Terms] AND ("labor, obstetric"[MeSH Terms] AND "labor stage, first"[MeSH Terms]) "Steam Bath"[MeSH Terms] AND ("labor pain"[MeSH Terms] OR ("labor"[All Fields] AND "pain"[All Fields]) OR "labor pain"[All Fields]) ("hydrotherapy/therapeutic use"[MeSH Terms] OR "hydrotherapy/therapy"[MeSH Terms]) AND ("Apgar Score"[MeSH Terms] AND 2019/01/01:2020/12/31[Date - Publication]) "warm"[All Fields] AND ("labor pain"[MeSH Terms] OR ("labor"[All Fields] AND "pain"[All Fields]) OR "labor pain"[All Fields]) ("immerse"[All Fields] OR "immersed"[All Fields] OR "immerses"[All Fields] OR "immersing"[All Fields] OR "immersion"[MeSH Terms] OR "immersion"[All Fields] OR "immersions"[All Fields] OR "immersive"[All Fields] OR "immersiveness"[All Fields]) AND "Uterine Contraction"[MeSH Terms] "warm"[All Fields] AND ("labor s"[All Fields] OR "labored"[All Fields] OR "laborer"[All Fields] OR "laborer s"[All Fields] OR "laborers"[All Fields] OR "laboring"[All Fields] OR "labors"[All Fields] OR "labour"[All Fields] OR "work"[MeSH Terms] OR "work"[All Fields] OR "labor"[All Fields] OR "labor, obstetric"[MeSH Terms] OR ("labor"[All Fields] AND "obstetric"[All Fields]) OR "obstetric labor"[All Fields] OR "laboured"[All Fields] OR "labourer"[All Fields] OR "labourers"[All Fields] OR "labouring"[All Fields] OR "labours"[All Fields])

### Embase

('heat'/exp OR heat) AND ('labor pain'/exp OR 'labor pain') ((('heat'/exp OR heat) AND ('uterus contraction'/exp OR 'uterus contraction')) AND 'randomized controlled trial'/de ('thermotherapy'/exp OR thermotherapy) AND ('uterine cervix ripening'/exp OR 'uterine cervix ripening') ('thermotherapy'/exp OR thermotherapy) AND ('delivery stage 1' OR (('delivery'/exp OR delivery) AND stage AND 1)) (('thermoregulation'/exp OR thermoregulation) AND ('labor pain'/exp OR 'labor pain')) AND 'randomized controlled trial'/de

('thermoregulation'/exp OR thermoregulation) AND ('delivery stage 1' OR (('delivery'/exp OR delivery) AND stage AND 1))  
 ('thermal conductivity'/exp OR 'thermal conductivity') AND ('uterus contraction'/exp OR 'uterus contraction')  
 ('thermal exposure'/exp OR 'thermal exposure') AND ('apgar score'/exp OR 'apgar score')  
 ('heat stress'/exp OR 'heat stress') AND ('apgar score'/exp OR 'apgar score')  
 ('heat tolerance'/exp OR 'heat tolerance') AND ('uterus contraction'/exp OR 'uterus contraction')  
 ('heat transfer'/exp OR 'heat transfer') AND ('uterine cervix ripening'/exp OR 'uterine cervix ripening')  
 ('water vapor'/exp OR 'water vapor') AND ('delivery stage 1' OR (('delivery'/exp OR delivery) AND stage AND 1))  
 ('water vapor'/exp OR 'water vapor') AND ('labor pain'/exp OR 'labor pain')

#### **Ovid:**

(hot temperature OR thermoregulation OR hot OR steam OR warm AND labor or obstetric pain).mp. [mp=title, abstract, full text, caption text]  
 (hot temperature OR thermoregulation OR hot OR steam OR warm AND labor or Labor onset or labor duration 1<sup>st</sup> stage).mp. [mp=title, abstract, full text, caption text]  
 (hot temperature OR thermoregulation OR hot OR steam OR warm AND uterine contractions OR myocardial activity) mp. [mp=title, abstract, full text, caption text]  
 (hot temperature OR thermoregulation OR hot OR steam OR warm AND Apgar score) mp. [mp=title, abstract, full text, caption text]

#### **Clinical key**

(hot temperature OR thermoregulation OR hot OR steam OR warm AND labor or obstetric pain).  
 (hot temperature OR thermoregulation OR hot OR steam OR warm AND labor or Labor onset or labor duration 1<sup>st</sup> stage).  
 (hot temperature OR thermoregulation OR hot OR steam OR warm AND uterine contractions OR myocardial activity)  
 (hot temperature OR thermoregulation OR hot OR steam OR warm AND Apgar score)

#### **Google & google scholar**

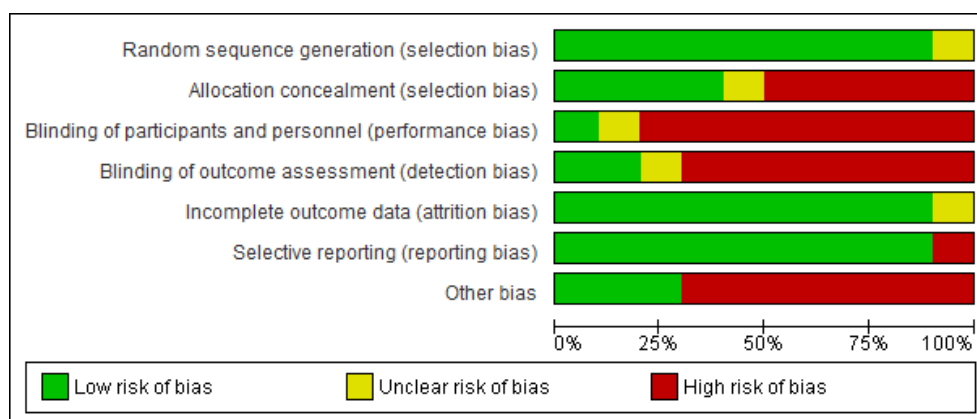
(hot temperature OR thermoregulation OR hot OR steam OR warm AND labor or obstetric pain).  
 (hot temperature OR thermoregulation OR hot OR steam OR warm AND labor or Labor onset or labor duration 1<sup>st</sup> stage).  
 (hot temperature OR thermoregulation OR hot OR steam OR warm AND uterine contractions OR myocardial activity)  
 (hot temperature OR thermoregulation OR hot OR steam OR warm AND Apgar score)

#### **PICO Framework**

<b>Population</b>	Primiparous women aged between 18-40 years
<b>Intervention</b>	Heat therapy
<b>Comparison</b>	Standard treatment with routine care and regular treatment

<b>Outcome</b>	<p><b>Primary Outcome:</b> Pain intensity, uterine contractions and duration of labor in first stage.</p> <p><b>Secondary Outcome:</b> Apgar score at 1<sup>st</sup> and 5<sup>th</sup> minute</p>
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**Supplementary file-2:** Risk of bias graph: review authors' judgments about each risk of bias item presented as percentages across all included studies.



**Supplementary file-3:** Risk of bias summary: review authors' judgments about each risk of bias item for each included study.

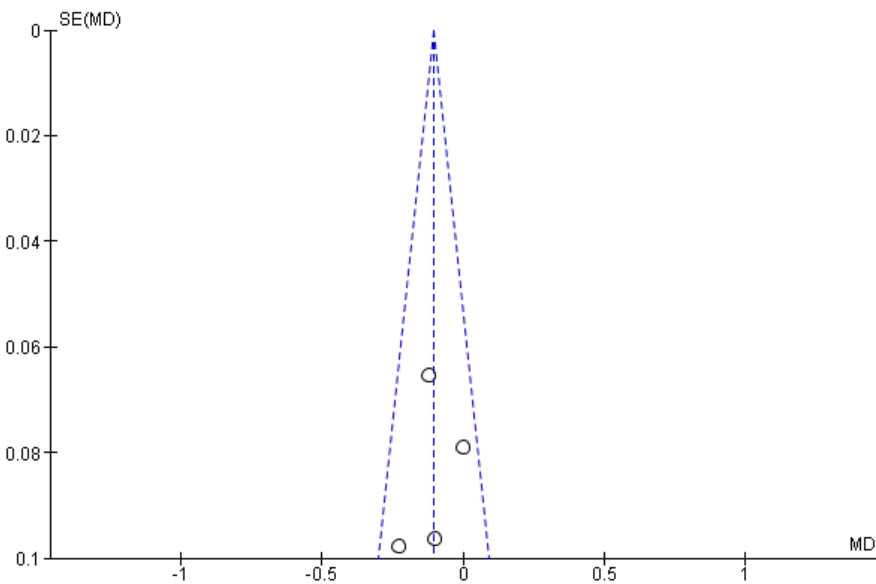
	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Akbarzadeh M et al; 2018, Iran	+	?	-	-	?	+	+
Behmanesh F et al; 2009, Iran	?	-	-	-	+	+	-
Eckert K et al; 2001, South Australia	+	+	?	?	+	-	-
Farahmand M et al; 2019, Iran	+	-	-	-	+	+	+
Kaur J et al; 2020India	+	-	-	+	+	+	+
Lee S et al; 2013, Taiwan	+	-	-	-	+	+	-
Silva F et al; 2007, Brazil	+	+	+	-	+	+	-
Taavoni S et al; 2013, Iran	+	-	-	+	+	+	-
Tarrats L et al; 2019, Spain	+	+	-	-	+	+	-
Yazdkhasti M et al;2018, Iran	+	+	-	-	+	+	-

#### Supplementary file-4: Risk of bias assessment using Cochrane checklist

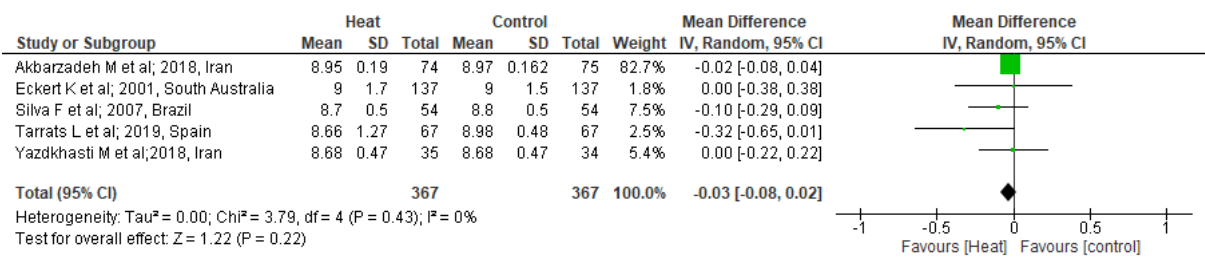
Study	Randomization (Selection Bias)	Allocation (Selection Bias)	Participant & Personnel Blinding (Performance Bias)	Outcome Blinding (Detection Bias)	Attrition Bias	Selective Reporting	Other Bias
1. <b>Kaur J et al; 2020 India</b>	<b>Low</b> Randomized with standardized method i.e., <b>Randomized computer-generated table</b>	<b>High</b> Opaque sealed and sequentially numbered envelopes were not used	<b>High</b> Participants were not blinded	<b>Low</b> Medical assessors were blinded to treatment	<b>Low</b> Complete outcome data reporting	<b>Low</b> All the study outcomes are reported	<b>Low</b> All sufficient information was provided regarding consort and trials registration.
2. <b>Tarrats L et al; 2019 Spain</b>	<b>Low</b> Randomized with standardized method i.e., <b>Randomized computer-generated table</b>	<b>Low</b> They used sealed, opaque, sequentially numbered envelopes for allocation concealment.	<b>High</b> Participants were not blinded	<b>High</b> Not blinded.	<b>Low</b> They have mentioned the reason for drop outs.	<b>Low</b> All the study outcomes are reported	<b>High</b> CONSORT diagram was not given.
3. <b>Farahmand M et al; 2019 Iran</b>	<b>Low</b> All mothers were randomly assigned in blocks of 4.	<b>High</b> Opaque sealed and sequentially numbered envelopes were not used	<b>High</b> Participants were aware of their treatment as they discussed treatment with physician or research team	<b>High</b> Outcome assessors were not blinded in this research trial	<b>Low</b> Complete outcome data reporting	<b>Low</b> All the study outcomes were clearly reported.	<b>Low</b> Information was sufficient to provide judgement
4. <b>Akbarzadeh M et al; 2018 Iran</b>	<b>Low</b> Randomized with standardized method i.e., <b>Randomization Table</b>	<b>Unclear</b> Allocation was mentioned but there was no mention that how it was done	<b>High</b> They have mentioned that, it was not possible to blind the study since both delivery and intervention were conducted in the same environment	<b>High</b> There was no mention of outcome assessor blinding	<b>Unclear</b> 1 participant lost to follow-up but they have not provided reason	<b>Low</b> All the study outcomes were clearly reported	<b>Low</b> Information was sufficient.
5. <b>Eckert K et al; 2001 South Australia</b>	<b>Low</b> Randomized with standardized method i.e., <b>Randomization Table</b>	<b>Low</b> Clear mention of allocation concealment i.e., sealed opaque envelopes	<b>Unclear</b> It was mentioned that conventional additional treatment was given to both the group which is indicative of blinding but not clear	<b>Unclear</b> Outcome was assessed by midwives but name of researcher is not there.	<b>Low</b> They have mentioned the reason for drop outs.	<b>High</b> 31 women with group B streptococcal colonization were not excluded and were entered into the trial	<b>High</b> Registration of clinical trial is not given.
6. <b>Behmanesh F et al; 2009 Iran</b>	<b>Unclear</b> They mentioned about randomly division but not	<b>High</b> Not mentioned about whether envelopes were opaque or	<b>High</b> Participants blinding were not mentioned	<b>High</b> Not mentioned about outcome assessor blinding	<b>Low</b> Complete outcome data reporting, no missing data	<b>Low</b> All the study outcomes were clearly reported	<b>High</b> Information about registration trial and CONSORT flow chart is not provided.

	explained how they have done it.	sequentially numbered					
<b>7. Yazdkhasti M et al; 2018 Iran</b>	<b>Low</b> Randomization process was mentioned i.e., <b>computer-based randomization</b>	<b>Low</b> Clear mention of allocation concealment i.e., sealed opaque envelopes	<b>High</b> Blinding of participants not mentioned	<b>High</b> Blinding of outcome assessors not mentioned	<b>Low</b> Clearly mentioned about participants who withdrew from study	<b>Low</b> All the study outcomes were clearly reported	<b>High</b> Data about registration trial is not mentioned.
<b>8. Taavoni S et al; 2013 Iran</b>	<b>Low</b> Randomized with standardized method i.e., <b>Randomization Table</b>	<b>High</b> Not mentioned	<b>High</b> Blinding of participants not mentioned	<b>Low</b> Statistician was blind	<b>Low</b> They have mentioned the reason for drop outs.	<b>Low</b> All the study outcomes were clearly reported	<b>High</b> Not mention about CONSORT and registration.
<b>9. Lee S et al; 2013 Taiwan</b>	<b>Low</b> Randomization process was done by <b>computer software.</b>	<b>High</b> Not mentioned about sealed or opaque envelopes used for allocation concealment.	<b>High</b> As participants were aware of their treatment	<b>High</b> Not mentioned about blinding of assessor or researcher involved in the study	<b>Low</b> They have mentioned the reason for drop outs.	<b>Low</b> All the study outcomes were clearly reported	<b>High</b> Data of registration trial is not given.
<b>10. Silva F et al; 2007 Brazil</b>	<b>Low</b> Randomization process was mentioned i.e., <b>Computer-based randomization</b>	<b>Low</b> List no. was covered by a tab, which hide the assigned group of the next subject to researcher.	<b>Low</b> Reason mentioned that blinding of participants is not possible in the study (due to water immersion)	<b>High</b> Not mentioned about blinding of assessor or researcher involved in the study	<b>Low</b> They have mentioned the reason for drop outs.	<b>Low</b> All the study outcomes were clearly reported	<b>High</b> Data of registration trial is not given.

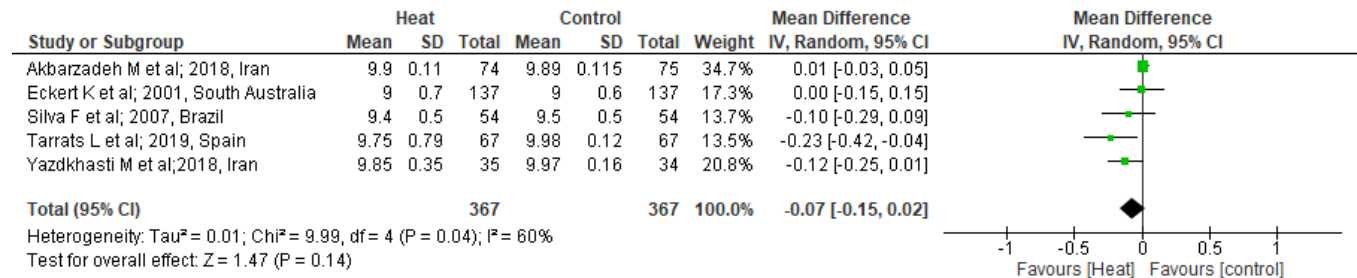
**Supplementary file-5:** Funnel plot of comparison: Heat Therapy versus RC, Outcome: Apgar score at 5<sup>th</sup> min.



**Supplementary-file 6:** Forest plot of comparison: HT versus RC, Outcome: Apgar score at 1<sup>st</sup> min.



**Supplementary file-7:** Forest plot of comparison: HT versus RC, Outcome: Apgar score at 5<sup>th</sup> min.



**Supplementary file-8:** Forest plot of comparison: HT versus RC, Outcome: Apgar score at 5<sup>th</sup> min.

