Table I. Studies on the effect of relaxation therapy during pregnancy on mother, fetus and the newborn. Grouped by technique (relaxation, massage and yoga).

<table>
<thead>
<tr>
<th>Authors, year</th>
<th>Study Type</th>
<th>Type of relaxation therapy</th>
<th>Dependent variable</th>
<th>Subjects/time point of assessment</th>
<th>Results</th>
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</thead>
</table>
| Little et al. (1984) | - sequentially assigned to groups | - Relaxation and biofeedback weekly  
- 6 weeks  
- Audio tape with relaxation instructions  
- Home exercise  
Group A: relaxation alone  
Group B: biofeedback and relaxation  
Group C: CG without relaxation | - Hospital admission  
- Number of days in hospital  
- BP  
- Pregnancy outcome: duration of labor, type of analgesia, postnatal maternal BP, birth weight, Apgar score, head circumference | $N = 60$  
Groups A and B: $n = 18$  
Group C: $n = 24$  
Women with blood pressure $\geq 135/85$ mm Hg  
Weeks of gestation: n.n. | - Groups A and B: Less admission to hospital ($p < .01$), fewer days in hospital ($p < .03$) and lower mean diastolic BP ($p < .03$)  
- Group A: lower systolic BP compared to group C ($p < .001$) (difference between group B and group C not significant) |
| Omer et al. (1986) | - randomized controlled | - 1-3 hypnotic-relaxation sessions (30 min)  
- Audio tape  
- twice a day during hospital stay  
- once a day after discharge  
EG: Medication + hypnotic relaxation  
CG: medication alone | Pregnancy outcome:  
- RPP  
- birth weight  
- infant mortality | $N = 113$  
EG: $n = 39$  
CG: $n = 74$  
Women hospitalized with diagnosed premature contractions  
Weeks of gestation: 26 - 34 until 37 | - EG compared to CG  
- higher RPP ($p < .002$)  
- Higher birth weight ($p < .005$) |
CG: No intervention  
NG (Nonadherent group): Discontinuation of progressive relaxation exercise after 1-2 weeks | Pregnancy outcome  
- RPP  
- gestational age  
- birth weight | $N = 107$  
EG: $n = 44$  
CG: $n = 40$  
NG: $n = 23$  
Women diagnosed with preterm labor  
Weeks of gestation: n.n. | EG compared to CG and NG:  
- Longer gestations ($p < .001$)  
- higher RPP ($p < .001$)  
- higher birth weight ($p < .001$) |
NSR condition: No stress reduction instructions  
- 1 days | Stress rating  
- CES-D  
- PANAS  
- Endocrine assay: morning C  
Weeks of gestation: 6 – 32 | $N = 41$  
Predominantly low-income Latina women | SR compared to NSR condition:  
- Lower levels of perceived stress ($p < .001$)  
- Lower levels of depression ($p = .002$)  
- Lower levels of negative affect ($p < .01$)  
- Lower morning C levels ($p = .01$) |
| [36] Bastani et al. (2005) | Randomized controlled | - Seven 90-min sessions of applied relaxation according to Ost (1987)  
- 7 weeks  
- Daily practice at home  
EG: applied relaxation  
CG: routine prenatal care | STAI state and trait  
- PSS  
Weeks of gestation: 14 – 28 | $N = 110$  
EG: $n = 55$  
CG: $n = 55$  
Iranian women with moderate to high anxiety (STAI State/Trait > 20) | EG compared to CG  
- Lower levels of anxiety (state and trait) ($p < .001$)  
- Lower levels of perceived stress ($p < .001$) |
<table>
<thead>
<tr>
<th>Study References</th>
<th>Design</th>
<th>Intervention</th>
<th>Outcome Measures</th>
<th>Sample Size</th>
<th>Differences</th>
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</thead>
<tbody>
<tr>
<td>Teixeira et al. (2005)</td>
<td>Randomized controlled</td>
<td>Single imagination exercise</td>
<td>STAI, Endocrine assays: NE, E, C, Doppler scan: uterine RI</td>
<td>N = 58</td>
<td>AR: Higher reduction of state anxiety (p &lt; .0001), Higher reduction of maternal HR (p &lt; .0001) PR: Higher increase of uterine RI (p = .002), Higher reduction of NE (p = .02) AR and PR: Equal decline of C levels (p = .002, p = .001)</td>
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<tr>
<td>Bastani et al. (2006)</td>
<td>Randomized controlled</td>
<td>Seven 90-min sessions of applied relaxation according to Ost (1987)</td>
<td>Birth weight, Gestational age at birth, Type of delivery</td>
<td>N = 110</td>
<td>EG compared to CG: Higher mean birth weight (p &lt; .009), Lower rates of low birth weight (&lt; 2500g) (p &lt; .003), Fewer abnormal types of delivery (p = 0.002), Rates of preterm birth (&lt; 37 weeks) one versus five, n.s., (p = .102) EG and CG: Equal gestational age at birth (p &lt; .689)</td>
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<tr>
<td>Study</td>
<td>Intervention Details</td>
<td>Outcome Measures</td>
<td>Comparison</td>
<td>Findings</td>
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<td>Nickel et al. (2006)</td>
<td>Randomized controlled PMR sessions of 30min, 3 times a week, Over 8 weeks, At home: daily practice for 15min twice a day</td>
<td>HR, BP, STAXI, SF-36</td>
<td>Women hospitalized with bronchial asthma, Weeks of gestation: n.n.</td>
<td>Decrease of systolic BP (p &lt; .001), Decrease of HR (p &lt; .001), Lower levels of anger (STAXI) (p &lt; .01), Higher levels in health-related quality of life (SF-36) (physical functioning: p = .06, role physical: p = .02, bodily pain: p = .04, general health perceptions: p = .02, vitality: p &lt; .001, social functioning: p &lt; .001, role emotional: p &lt; .001, mental health: p &lt; .01)</td>
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<tr>
<td>Saisto et al. (2006)</td>
<td>Randomized controlled Group sessions (120 min) consisting of discussions, visualization and relaxation exercises, Once a week over 5 weeks</td>
<td>Mode of delivery, Duration of labor and delivery, Epidural analgesia during vaginal delivery</td>
<td>Women with fear of childbirth, Weeks of gestation: 31</td>
<td>Higher rates of vaginal delivery (p = .02), Lower rates of elective caesarean sections (p = .05)</td>
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<tr>
<td>Study</td>
<td>Type</td>
<td>Intervention</td>
<td>Measurements</td>
<td>Sample</td>
<td>Results</td>
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<tr>
<td>DiPietro et al. (2008)</td>
<td>Randomized Controlled</td>
<td>Single guided imagery progressive relaxation session</td>
<td>HR, Skin conductance level, FM, FHR, FHR variability, FM-FHR-coupling, Uterine and umbilical artery RI, Endocrine assay: C</td>
<td>N = 100</td>
<td>Maternal results: Reduction of HR (p &lt; .0001), skin conductance level, C (p &lt; .0001), RI in umbilical artery (p &lt; .01) Fetal results: Reduction of FHR (p &lt; .05) and FM (p &lt; .0001) Increase of FHR variability (p &lt; .01) and FHR-FM-coupling (p = .001)</td>
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<tr>
<td>Vieten &amp; Astin (2008)</td>
<td>Randomized Controlled</td>
<td>Mindful motherhood intervention (breath awareness, guided body awareness meditation, yoga, acceptance and cultivation an observing self)</td>
<td>PSS, CES-D, STAI, PANAS-X</td>
<td>N = 31</td>
<td>EG: n = 13, CG: n = 18</td>
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</table>
| [25] Urech et al. (2010) | - Randomized controlled  
- Single relaxation exercise  
- 10min  
- Practice at home  
PMR: Progressive muscle relaxation  
GI: Guided imagery  
CG: Passive relaxation, control condition | - Endocrine assays: C, ACTH, NE, E  
- HR  
- BP  
- STAI  
- VAS | \(N = 39\)  
PMR: \(n = 13\)  
GI: \(n = 13\)  
KG: \(n = 13\)  
Weeks of gestation: 32 - 34 | GI compared to PMR and CG:  
- Higher levels of perceived relaxation (VAS) \((p = .007)\)  
GI and PMR compared to CG:  
- Lower HR levels \((p = .027)\)  
All groups:  
- Lower levels of C, ACTH and NE \((p < .001)\) |
|---|---|---|---|---|
| [46] Fink et al. (2011) | - Randomized controlled  
- Single relaxation exercise  
- 10min  
- Practice at home  
PMR: Progressive muscle relaxation  
GI: Guided imagery  
CG: Passive relaxation, control condition | - FHR, FHR variability, fetal movement | \(N = 39\)  
PMR: \(n = 13\)  
GI: \(n = 13\)  
KG: \(n = 13\)  
Weeks of gestation: 32 - 34 | GI, PMR, CG:  
- No significant findings regarding FHR  
GI and PMR compared to CG:  
- Higher FHR long-term variation during and after relaxation \((p = .039)\)  
GI compared to PMR:  
- GI fetuses showed more fetal body movements after relaxation \((p = .027)\) |
| [31] Field et al., (1999) | - **randomized** | - Sessions of 20min twice a week over 5 weeks  
MT group: Massage therapy  
PMR group: Progressive muscle relaxation | - STAI  
- POMS-D  
- CES-D  
- Perinatal Anxieties and Attitudes Scale  
- Maternal-Fetal Attachment Scale  
- OCS  
- PNF  
- Endocrine assays: Cortisol, NE, E, D, S | $N = 26$  
MT group: n = 14  
PMR group: n = 12  
Weeks of gestation: 14 – 30 | Short-term measures (pre-post session):  
MT group: Mood improvement (p < .005)  
MT and PMR group: Lower levels of anxiety (p < .01)  
Long-term measures (first/last day):  
MT group: Better pregnancy report, less worries (p < .001), increased perceived social support (p < .05), fewer obstetric and postnatal complications (p < .05), decrease of NE (p < .01), increase of dopamine (p < .01), no changes in cortisol (p = .60)  
PMR group: more worries (p < .01), lower level of perceived social support (p < .05)  
MT and PMR group: increase of D (p < .01, p < .05) |
<table>
<thead>
<tr>
<th>Reference</th>
<th>Design</th>
<th>MT group</th>
<th>PMR group</th>
<th>CG group</th>
<th>ND-CG group</th>
<th>Sample Size</th>
<th>Measures</th>
<th>Week of gestation</th>
<th>Outcomes</th>
</tr>
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<tbody>
<tr>
<td>Field et al. (2004)</td>
<td>Randomized controlled</td>
<td>Massage therapy, 20min, twice a week over 16 weeks</td>
<td>PMR, 20 min, twice a week over 16 weeks</td>
<td>Standard prenatal care over 16 weeks</td>
<td>Non-depressed CG with standard prenatal care</td>
<td>MT: n = 28, PMR: n = 28, CG: n = 28</td>
<td>STAI, POMS, CES-D, OCS, PMR, Endocrine assays: C, NE, D, S, Fetal activity, NBAS</td>
<td>18 – 24</td>
<td>MT group: increase of S and D, decrease of C and NE (p &lt; .05), mood improvement (p &lt; .05), lower levels of anxiety (p &lt; .05) Long-term measures (first/last day): MT group: decrease of levels of depression (p &lt; .05), fetal activity (p &lt; .05), fewer obstetric complications (p &lt; .05) MT and PMR group: Fewer postpartum complication (p &lt; .05), better performance on the NBAS (p &lt; .05)</td>
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<tr>
<td>Field et al. (2006)</td>
<td>Randomized</td>
<td>Massage sessions of 20min twice a week over 16 weeks</td>
<td>Moderate pressure massage (indentation of the skin)</td>
<td>Light pressure massage (brush the surface of the skin)</td>
<td>Newborns (1 week of age) of depressed mothers (CES-D ≥ 16)</td>
<td>MPM: n = 34, LPM: n = 30</td>
<td>Behavior observation, NBAS</td>
<td>During second trimester</td>
<td>MPM compared to LPM: More smiling (p &lt; .01) and vocalizing during observation time (p &lt; .05) Better scores on orientation (p &lt; .05), motor (p &lt; .05), excitability (p &lt; .01), and depression cluster of NBAS (p &lt; .05)</td>
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<tr>
<td>Reference</td>
<td>Study Design</td>
<td>Intervention</td>
<td>Outcome Measures</td>
<td>Sample Size</td>
<td>EG Compared to CG</td>
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<tr>
<td>[37] Field et al. (2008)</td>
<td>Randomized</td>
<td>20min massage sessions&lt;br&gt;- Applied by partner&lt;br&gt;- Twice a week&lt;br&gt;- Over 16 weeks</td>
<td>CES-D&lt;br&gt;STAI&lt;br&gt;STAXI&lt;br&gt;Relationship Questionnaire</td>
<td>N = 47&lt;br&gt;EG: n = not described&lt;br&gt;KG: n = not described</td>
<td>Women: Lower levels of depression (p &lt; .001), anxiety (p &lt; .001) and anger (p &lt; .01), improvement in relationship (p &lt; .01)&lt;br&gt;Partners: Lower levels of depression (p &lt; .01) and anxiety (p &lt; .01) and improvement in relationship (p &lt; .05)</td>
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<td>[21] Narendran, Nagarathna, Narendran et al. (2005)</td>
<td>Not randomized</td>
<td>Integrated approach of yoga therapy (IAYT)&lt;br&gt;- 1h daily practice&lt;br&gt;- Practice until delivery</td>
<td>PIH&lt;br&gt;IUGR&lt;br&gt;Mode of delivery&lt;br&gt;Gestational age at delivery&lt;br&gt;Birth weight</td>
<td>N = 335&lt;br&gt;EG: n = 169&lt;br&gt;CG: n = 166</td>
<td>EG compared to CG:&lt;br&gt;- Lower rates of preterm deliveries (p = .10)&lt;br&gt;- Lower rates of small-for-gestational-age babies (p = .12)&lt;br&gt;- Idiopathic IUGR (p = .003) and IUGR associated with PIH in the EG (p = .025)</td>
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<td>[43] Narendran, Nagarathna, Gunasheela et al. (2005)</td>
<td>Not randomized</td>
<td>Integrated approach of yoga therapy (IAYT)&lt;br&gt;- 1h daily practice&lt;br&gt;- Practice until delivery</td>
<td>PIH&lt;br&gt;IUGR&lt;br&gt;Birth weight&lt;br&gt;Preterm delivery&lt;br&gt;Additional subsample with Doppler abnormalities</td>
<td>N = 121&lt;br&gt;EG: n = 68&lt;br&gt;CG: n = 53</td>
<td>EG compared to CG:&lt;br&gt;- Higher birth weight (p &lt; .018)</td>
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<td>Study</td>
<td>Design</td>
<td>Interventions</td>
<td>Measures</td>
<td>Sample Size</td>
<td>EG Compared to CG:</td>
<td>Heart Rate Variability (pre-during-session):</td>
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<tr>
<td>Chuntharapat et al. (2008)</td>
<td>Randomized</td>
<td>- Six 60min yoga sessions&lt;br&gt;- Practice at home&lt;br&gt;- At least three times a week</td>
<td>- STAI&lt;br&gt;- VASTC&lt;br&gt;- MCQ&lt;br&gt;- VASPS&lt;br&gt;- Apgar scores&lt;br&gt;- Duration of labor</td>
<td>N = 66&lt;br&gt;EG: n = 33&lt;br&gt;CG: n = 33&lt;br&gt;Weeks of gestation: 26 – 37</td>
<td>- Higher maternal comfort during labor and 2h after birth (p &lt; .05)&lt;br&gt;- Lower levels of pain during labor (p &lt; .05)&lt;br&gt;- Lower duration of labor (p &lt; .05)</td>
<td>- Equal decrease of LF bands (p &lt; .001) and LF/HF ratio (p &lt; .001)&lt;br&gt;- Equal increase of HF bands in pw 20 (p &lt; .001)&lt;br&gt;- Increase of HF bands in pw 36 in EG only (p &lt; .001)</td>
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<tr>
<td>Satyapriya et al. (2008)</td>
<td>Randomized</td>
<td>- Integrated approach of yoga therapy (IAYT)&lt;br&gt;- First month: 2-hour sessions 3 days per week from trained instructors&lt;br&gt;- After first month: 1-hour sessions daily at home</td>
<td>- PSS&lt;br&gt;- HR variability: low frequency bands, high frequency (HF) bands, LF/HF ratio</td>
<td>N = 99&lt;br&gt;EG: n = 45&lt;br&gt;CG: n = 45&lt;br&gt;Weeks of gestation: 18 – 20</td>
<td>- Lower levels of perceived stress (PSS) (p = .001)</td>
<td>- Decrease of LF bands in EG only in pw 36 (p &lt; .001)&lt;br&gt;- Equal reduction of LF/HF ratio in pw 36 (p &lt; .001)&lt;br&gt;- Equal increase of HF bands in pw 36 (p &lt; .001)</td>
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BP: Blood pressure; C: Cortisol; CES-D: Center for Epidemiological Studies-Depression Scale; CG: Control group (= no experimental treatment); D: Dopamine; E: Epinephrine; EG: Experimental / Treatment group; FHR: Fetal heart rate; FM: Fetal movement; HR: heart rate; IAYT: Integrated approach of yoga therapy;
IUGR: Intrauterine growth retardation; MCQ: Maternal comfort questionnaire; NBAS: Brazelton Neonatal Behavior Assessment Scale; NE: Norepinephrine; OCS: Obstetric Complications Scale; PANAS: Positive and Negative Affect Schedule; PANAS-X: Positive and Negative Affect Schedule – Extended; PIH: Pregnancy induced hypertension; PMR: Progressive muscle relaxation; PNF: Postnatal Factor Scale; POMS-D: Profile of Mood States Depression Scale; pw: Pregnancy week; PSS: Perceived Stress Scale; RI: Resistance index; RPP: Rate of pregnancy prolongation; S: Serotonin; SF-36: Health Survey Questionnaire; STAI: State-Trait Anxiety Inventory; STAXI: State-Trait Anger Expression Inventory; VAS: Visual analogue scale; VASPS: Visual analogue sensation of pain scale; VASTC: Visual analogue scale to total comfort.