

# Interventions to reduce anxiety during pregnancy: an overview of research

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## Introduction

This is the third in a series of articles about improving health and wellbeing for parents and their children during the perinatal period. This article will aim to give an overview of current review evidence about non-pharmacological interventions that aim to reduce anxiety felt by women during pregnancy.

## Background

Pregnancy is a time when families use the health service regularly for several months and when women and their partners are often highly motivated to address issues affecting their health in order to give their baby a good start in life. As well as the chance to improve the outcome of the pregnancy, it has often also been targeted as a time when the long-term health and wellbeing of the baby and others in the family can be influenced, particularly for the most vulnerable or disadvantaged families where the benefits are likely to be greatest.

There is a growing body of literature showing that anxiety and depression are both related and distinct conditions.<sup>1</sup> Research has focused increasingly on the antenatal period, and it is now known that antenatal depression frequently precedes and may even be more common than postnatal depression.<sup>2</sup> There is considerable interest in the prevalence and impact of anxiety during pregnancy. For example, a study based on the Avon Longitudinal Study of Parents and Children (ALSPAC),<sup>3</sup> a large prospective

longitudinal study of a community sample of children in England that has been followed prospectively since pregnancy, has found that antenatal anxiety and postnatal depression are both risks for behavioural and/or emotional problems in children at four years of age. The results were positive after controlling for smoking, alcohol use, birth weight for gestational age, maternal age, child sex, and socioeconomic status.<sup>1</sup> This group, and others, suggested that preventive interventions designed to improve child mental health should target antenatal anxiety, and that this might be more effective than interventions designed to reduce the impact on children of maternal postnatal depression.<sup>1,4</sup>

Anxiety affects people in different ways. It can feel like being worried all the time, tired, unable to concentrate, irritable or down, and it can lead to physical symptoms, such as a fast heartbeat, sweating, muscle pains and tension, trembling, numbness and tingling in the fingers or toes or lips, breathing fast, dizziness, indigestion, or going to the toilet more often than usual.<sup>5,6</sup> Anxiety is a normal response to external pressures or stresses:<sup>6</sup> everybody can feel anxious in stressful or threatening situations.<sup>5</sup> Anxiety becomes a problem if it is present all the time or for no obvious reason and if it makes the person involved uncomfortable or stops her from doing what she needs or wants to do.<sup>5,6</sup>

There are three main anxiety disorders, although they frequently overlap so that people may experience more than one form:<sup>5,7</sup>

- Generalised anxiety disorder – when symptoms of anxiety are present most of the time.
- Panic attacks – when the person has unpredictable and intense anxiety attacks.
- Phobias – when the person is frightened of something that most people do not find frightening.

There are several reasons why people may develop an anxiety disorder. Some people seem more susceptible to anxiety than others and evidence suggests there may be genetic differences which make some people more prone to suffer persistent anxiety.<sup>5</sup> People with depressive illness may also experience anxiety symptoms and panic attacks. People with anxiety symptoms can imagine they have a serious physical disease, which can lead them to become more anxious. Difficult, upsetting or threatening events or circumstances, or major life changes, can cause anxiety. Sometimes this persists long

after the situation has ended. Street drugs, like amphetamines, but also more common substances, such as caffeine in coffee, can cause or exacerbate anxiety. Some illnesses, such as thyroid disease, can lead to feelings of anxiety.<sup>5,8</sup>

Reliable estimates about the proportion of pregnant women who feel anxiety that is intrusive or interferes with their daily activities, or who are exposed to substantial or chronic stresses while pregnant, are lacking.<sup>9</sup> Nevertheless, anxiety disorders are common: it has been suggested that between about one in ten and one in three people will have an anxiety disorder at some point in their life.<sup>8</sup> As well as being common, distressing or disturbing, anxiety disorders are often not treated promptly or at all: one study found that only about 40% of people with generalised anxiety disorder sought professional help in the same year as the problem started.<sup>10</sup>

Pregnancy is a time when women may feel increased anxiety. The state of pregnancy can be a cause of anxiety, as can worries about the health of the unborn baby, what will happen during labour or after the baby is born. Women who had problems with previous pregnancies may be more likely to be anxious, for example women who have had miscarriages.<sup>11</sup> Anxiety can also be aggravated by external stresses, such as a lack of resources or work responsibilities.<sup>12</sup> Women who are vulnerable or disadvantaged may have particular anxieties about their safety or about their basic needs for suitable housing and adequate income.

A recent narrative review of research on the effects of anxiety in pregnancy described an association with poorer outcomes.<sup>9</sup> The review reported, for example, that major life events and chronic stress, such as stress at home, were associated with preterm birth, and that neighbourhood stresses, such as crime or poverty, were associated with gestational age or preterm birth.<sup>9</sup> Anxiety specifically about a current pregnancy was also reported as having an adverse effect on preterm birth or gestational age.<sup>9</sup> The review also indicated that there is substantial evidence for the adverse effects of stress and anxiety in pregnancy on a child's long-term future, including learning, behaviour and motor development.<sup>9</sup> It is believed that this occurs through effects on the baby's nervous system and the mother's and baby's hormonal control systems.<sup>9</sup>

This review focuses on non-pharmacological interventions that aim to reduce anxiety during pregnancy and which, therefore, have the potential to improve short and

long-term outcomes for mothers and children. Non-pharmacological interventions, sometimes called mind-body interventions, involve techniques that engage with thought processes, body awareness and behaviour, for example hypnosis, tai-chi, yoga and meditation.<sup>13</sup> Non-pharmacological interventions might be expected to have fewer side effects than pharmacological treatments and they might also be seen as a way of preventing as well as reducing anxiety.

Discussing evidence linking anxiety with poor outcomes with pregnant women could potentially be counterproductive, further increasing their anxiety levels, and such evidence should, therefore, probably be treated with caution in terms of how it is conveyed. It would, however, be very useful to be able to balance any conversations about the effects of anxiety in pregnancy with a discussion of interventions that could help to reduce anxiety.

In order for NCT practitioners and health professionals to be well informed about the potential benefits and risks of non-pharmacological interventions, it is important to assess their efficacy (effectiveness) based on high-quality scientific studies. Anxiety in these studies is often measured by a questionnaire called the State Trait Anxiety Inventory, which has questions that measure the level of temporary anxiety related to a specific situation, called state anxiety, and more general and long-standing anxiety, called trait anxiety.<sup>14</sup>

## Method

First, Medline was searched via PubMed to identify review articles with stress or anxiety and words related to pregnancy ('antenatal' or words beginning 'pregnan') in the title. A second search was conducted to identify reviews with stress or anxiety in the title or abstract, words related to pregnancy in the title, and that had been indexed under complementary therapies or that had mind-body in the title or abstract. Both searches were restricted to reviews published in the last ten years because the aim of the overview was to outline current evidence. The searches were also restricted to humans and to reviews that were in English as time and resource constraints meant that translation of reviews from other languages was not possible. Finally, the Cochrane Database of Systematic Reviews was searched by looking for reviews under relevant topic headings.

Systematic reviews were eligible as long as they considered the impact of non-pharmacological interventions aimed at reducing anxiety during pregnancy prior to intrapartum care. Reviews were excluded if

they only focused on:

- Women with mental-health issues other than anxiety, e.g. depression
- Pharmacological interventions
- Women with specific medical conditions, e.g. asthma
- Specific investigations, e.g. ultrasound
- Improving the experience of labour

Eligible reviews were appraised using Critical Appraisal Skills Programme (CASP) checklists and summarised to provide an overview of research in this area.<sup>15</sup> Studies were included based on whether they considered the impact of reducing anxiety, and any outcomes were considered relevant, for example physiological, psychological or perinatal, as long as they had some relevance to the short- or long-term impact on the wellbeing of the mother and her baby.

## Results

### Searches

Fifty-six articles were retrieved by the first Medline search, only one of which was found to be relevant after reviewing the abstracts. Only nine articles were retrieved by the second search, but three of them were found to be relevant after reviewing the abstracts, including the single review already identified by the first search, which was a Cochrane review. No further relevant Cochrane reviews were identified by searching the Cochrane database.

### Review of yoga during pregnancy

A medium-quality review (6 out of 10 on the CASP checklist) published in 2011 aimed to identify trials that assessed peripartum outcomes among women practising yoga.<sup>16</sup> The review included five observational studies, involving women from India, the USA and Taiwan, who were usually healthy, educated and married middle-to-upper-class women:

- The largest study involved 335 women, chosen because they lived close to the hospital, who were taught yoga postures, breathing techniques and mantra meditation and asked to practise them for an hour each day.<sup>17</sup> They were compared with women living further away who were asked to walk for 30 minutes twice each day instead. The yoga group were significantly less likely to have intrauterine growth restriction, preterm labour or babies with birthweights of less than 2,500g.
- Another study concerned a sample of these women with abnormal umbilical and uterine artery Doppler scores.<sup>18</sup> The one significant finding was a higher mean birthweight among those women practising yoga.

The remaining three observational studies reported several significant results, although they involved small numbers of women and should, therefore, be treated with caution. They reported that: women who had practised yoga had fewer discomforts at 38-40 weeks than women who had not done so; women in the second trimester had lower pain scores,<sup>19</sup> fewer awakenings, less time awake during the night, and less perceived sleep disturbance after practising yoga; and women in the third trimester had lower scores for long-standing anxiety after practising yoga.<sup>19</sup>

Although these observational studies demonstrated significant findings, the authors of the review recommended that the results be treated very cautiously because important factors which may have affected the outcomes would not have been fully controlled for in the study because of the non-randomised designs.

Two randomised controlled trials (RCTs), involving about 200 women, were also described in the review, although one of them focused on the effects of yoga on labour only. The other reported that women from India who had practised yoga had significantly less perceived stress and significantly improved scores for various aspects of quality of life, including physical, psychological and social, than women who had done standard prenatal exercises. Again, the authors of the review urged caution about the findings as this trial was graded below the acceptable quality threshold and the person who measured the outcomes knew the groups to which women had been assigned. Finally, the authors also noted that most of the studies included in this review had limited generalisability given the relative affluence of the samples of women involved.

### Review of mind-body interventions during pregnancy

A medium-quality review (5.5 out of 10 on the CASP checklist) published in 2008 aimed to evaluate quantitative evidence for relaxation, stress reduction, and mind-body interventions in reducing prenatal stress and anxiety and maximising healthy birth outcomes.<sup>20</sup> Twelve studies were included, assessing psychoeducation, relaxation, and yoga and meditation. Studies of cognitive behavioural therapy were excluded as they tend to focus on treatment of other mental health problems, such as depression. Studies assessing psychoeducational interventions that relied solely on social support, education, problem-solving or coping skills and that did not include a relaxation, imagery or psychosomatic component were also excluded.

## Psychoeducation

These interventions combine psychological strategies to promote greater personal understanding with group education to assist with changing attitudes and behaviours.<sup>20</sup> Two studies aimed to address a fear of childbirth, but a third non-randomised prospective study assessed measures related to stress among about 220 pregnant women from Hawaii. The women received psychosocial input to promote adaptation to childbearing (managing distressing symptoms, instruction on childbearing topics, mobilising social support and integrating cultural beliefs and ethnic healers into pregnant women's lives) and were compared with a group of women who received usual care. In this study, women who received the intervention had significantly lower scores for stressful events and psychological distress than the other women by the third trimester, and they had significantly lower scores for stressful events and psychological distress and significantly higher scores for purpose of life, mastery and self-esteem after the baby was born.<sup>21</sup>

## Relaxation techniques

Six studies looked at the effects of relaxation techniques. One concerned women in preterm labour, another involved women with hypertension, and a third looked at the effect of relaxation among women with asthma, leaving three studies:

- In one study, around 40 women with low incomes in the USA were reminded to relax and avoid stress during antenatal visits. Although the women reported fewer symptoms of depression, less stress and better mood, and they had lower morning cortisol levels, there was no comparison group so it is difficult to be sure that the reminder was responsible for the improvements seen.
- A randomised trial from the UK compared active (45-minute session of guided hypnotherapy imagery) and passive relaxation (45 minutes quietly reading a magazine) among nearly 60 women between 28 and 32 weeks' gestation.<sup>22</sup> Both active and passive relaxation significantly reduced the median of the anxiety score related to how the women felt at that time and their median heart rate and the reductions were significantly greater with active relaxation. In contrast, passive but not active relaxation significantly reduced the median noradrenaline level. Both methods significantly reduced the median cortisol level, but the reductions were not significantly different. The authors of the review felt that the study was limited by the active but not the passive relaxation group being taught by a trainer, making it difficult to isolate the

effect of the trainer from the content of the intervention.

- A randomised trial from Iran of about 110 women looked at the effect of applied relaxation training (devised by Ost to enable rapid relaxation) as part of their usual antenatal care. Anxiety scores (related to how the women generally felt and how they felt at that time) and stress scores decreased significantly among the women who had the training when compared to the scores for the women who did not receive it. Mean birthweight was significantly greater among babies born to women in the relaxation than the usual care group and the caesarean section rate was also significantly lower. Again, the authors of the review felt that the differences could relate to the active nature of the intervention, rather than its content, and they noted that exclusion criteria for the trial were not published.

## Yoga and meditation

The two eligible studies identified<sup>17,18</sup> have already been described in this article as they were included in the medium-quality review of yoga during pregnancy.<sup>16</sup> The authors of the current review added to the previously expressed reservations about these studies. Specifically, they felt that selection bias, that is, non-random differences between the group of women who practised yoga and the group of women who walked regularly instead, was likely because the group in which women were placed depended on how close they lived to the hospital.

Overall, the authors of this review of mind-body interventions pointed out there were often drawbacks in the design of the studies identified, for example failure to use a randomised design. They also felt that the authors of the studies included in the review did not usually provide sufficient information about the intervention. They concluded that evidence suggests that improvements may result from the use of mind-body interventions during pregnancy, but that further well-designed trials are needed.

## Cochrane review of mind-body interventions during pregnancy for preventing or treating women's anxiety

A fairly high-quality Cochrane review (8 out of 10 on CASP checklist) published in 2011 aimed to assess the benefits of mind-body interventions during pregnancy in preventing or treating anxiety and influencing perinatal outcomes.<sup>23</sup> Randomised trials involving pregnant women in clinical settings were eligible for the review. Studies involving psychological or psychosocial interventions, including cognitive behavioural therapy, were excluded as they are the subject of another

as yet unpublished Cochrane review. Eligible mind-body interventions were divided into ten categories (see box). Relaxation therapies were only eligible if the therapeutic goal was to facilitate mental relaxation.

## Categories of mind-body interventions

- Autogenic training – mental exercises involving relaxation, autosuggestion and body awareness
- Biofeedback – training to improve health and well-being based on signals from one's own body
- Hypnotherapy – induction of trance-like state to facilitate relaxation and enhanced suggestibility
- Imagery – facilitating coping by imagining a pleasant object or experience
- Meditation – range of self-directed mental practices to bring about self-awareness and inner calm
- Prayer – within or outside an organised religion
- Relaxation therapy – numerous types of relaxation therapies exist
- Auto-suggestion – verbal therapy where the person repeats affirmations or suggestions
- Tai chi – meditative exercise using slow circular stretching movements and positions of balance
- Yoga – gentle exercises for attaining bodily or mental control and well-being

Source: Marc I, Toureche N, Ernst E, et al. Mind-body interventions during pregnancy for preventing or treating women's anxiety. Cochrane Database of Systematic Reviews 2011, Issue 7. Art. No.: CD007559. DOI: 10.1002/14651858.CD007559.pub2.

Eight RCTs (about 550 women) were included in the review. They were conducted in the USA, Canada, the UK, China, Switzerland and Italy. The interventions assessed were hypnotherapy (n=1), imagery (n=5), yoga (n=1) and respiratory autogenic training (n=1).

## Hypnotherapy

This randomised trial from the UK,<sup>22</sup> which compared one session of hypnotherapy with passive relaxation, has already been described in this article as it was included in the medium-quality review of mind-body interventions.<sup>20</sup> That review focused on changes in outcome measures, based on measurements before

and after the intervention, and whether these changes differed significantly between the groups. This Cochrane review instead looked at the absolute values of outcomes measures at one point only, after the intervention, and there were no significant differences between the active and passive relaxation groups in the median values of outcomes measured at that time. This review also pointed out that women were selected based on their anxiety level (30 scoring high and 28 scoring low for anxiety at that time) and only non-smoking women were selected.

### Imagery

Two studies looked at reducing anxiety in the postpartum period rather than during pregnancy and two focused on assisting with pain and anxiety during childbirth, although one of them did assess the effects of the intervention on anxiety before labour. In that Canadian trial, 60 women had either relaxation and information on labour and delivery alone or with birth visualisation as part of their antenatal classes. Women in the visualisation group had lower scores for anxiety after the last class, but the difference was not significant at the 95% confidence level ( $p=0.06$ ), although just outside the range.

A small Swiss RCT assessed the immediate effects of imagery on stress and anxiety among three groups each with 13 pregnant women. It compared:

- Guided imagery involving imagining a safe place (taught by headphones)
- Progressive muscle relaxation (taught by headphones)
- Sitting quietly for the same amount of time

There was no significant difference in the reduction in the score for the level of anxiety between the imagery and either of the comparison groups. There were significant differences, however, in adrenaline levels and the level of relaxation reported by women, with women in the imagery group having better outcomes.

### Yoga

The only eligible study included 34 women randomised to the intervention (eight weekly two-hour sessions of mindfulness training including yoga with daily home practice) or standard care.<sup>24</sup> Women were eligible for the study if they had a history of mood concerns for which they had sought treatment. The authors of the review reported that there were no significant differences in the absolute values of the outcome variables between the groups after the intervention. In contrast, though, the authors of the original study reported that, after controlling for the baseline values, women who practised yoga had significantly

greater falls in their mean scores for anxiety at that time and negative mood than women who had not done so.<sup>24</sup>

### Autogenic training

The only eligible study concerning this type of intervention focused on reducing anxiety and pain during labour and delivery.

Overall, the authors of this review commented on the generally poor quality and reporting of the eligible studies. Although blinding is not really possible for those giving or receiving these kinds of interventions, researchers assessing outcomes and clinicians involved in providing other care can be blinded. Unfortunately, this was usually not done, not reported, or both. Furthermore, objective outcome measures were often not used, sample sizes were small, and dropout rates were high. The authors also commented on the diversity of interventions, meaning that it was very difficult to combine results in a meaningful way. Despite these drawbacks:

- The authors felt that there was some evidence that mind-body interventions might be effective in reducing anxiety related to pregnancy, but this was based on positive results from studies focusing on anxiety related to labour or after the birth, rather than anxiety during pregnancy.
- Overall, they concluded that, although mind-body interventions might be useful for preventing anxiety during pregnancy, there was currently insufficient evidence to assess the effectiveness of mind-body interventions on anxiety and related outcomes during pregnancy.
- They also said that there was no evidence to draw conclusions about the value of such interventions for chronic anxiety.
- The authors were surprised at the lack of evidence given the popularity of activities such as prenatal yoga, and they highlighted the urgent need for further high-quality research in this area.
- They did note, however, that no harmful effects were reported for any mind-body interventions in the reviewed studies.

### Discussion

#### Main findings

In general, the reviews identified for this review themselves found few eligible studies and those studies were usually small and described as poorly designed, meaning that the results from them should be treated very cautiously.

Some studies reported that yoga significantly improved outcomes related to maternal wellbeing and some perinatal outcomes. They were, however, observational studies, meaning that bias cannot be ruled out: in other words, there is no way of knowing whether other causal

factors affecting outcomes have all been taken into account. There was also a randomised trial but there were concerns about the quality of the study design and the women who took part were relatively affluent, limiting the applicability of the results to other groups.

Relaxation and guided imagery were assessed by several reviews, but the results were mixed. A trial of training to enable rapid relaxation reported that this could improve perinatal outcomes, such as birthweight, as well as reducing anxiety levels. A study that simply involved advising women to relax and avoid stress was also reported to have positive effects, but there was no comparison group to check that the effects were actually due to the intervention. A randomised trial of guided hypnotherapy imagery compared with reading a magazine quietly found that both had positive effects but that one form of relaxation was not conclusively better than the other. Another study found that there was no significant difference in the reduction in anxiety scores between a group of women that imagined a safe place and another group who simply sat quietly or did progressive muscle relaxation, although there were significant differences in adrenaline levels and the level of relaxation reported by women. Lastly, a trial that looked at the inclusion of birth visualisation in antenatal classes found that women in the visualisation group had lower scores for anxiety at that time, but the difference was not significant.

Finally, one review reported that an intervention combining psychological strategies to promote greater personal understanding with group education to assist with changing attitudes and behaviours during pregnancy improved a range of outcomes related to wellbeing, such as self-esteem and purpose of life. Again, however, this study had a non-randomised design.

### Limitations

This review aimed to identify relevant reviews of evidence by systematically searching key sources. Only three eligible reviews were identified, despite the anecdotal popularity of mind-body interventions, such as yoga, during pregnancy. Time and resource constraints meant it was not possible to exhaustively search all possible sources so some minor reviews may have been overlooked, but it seems unlikely that high quality reviews published in mainstream journals have been missed. Furthermore, the studies that were eligible for the identified reviews were often small and poorly designed. This highlights the overall paucity of research in this area. Practitioners will undoubtedly be frustrated about the lack of a firm evidence base and the resulting lack of clear recommendations. One of the reviews did point out that mind-body interventions were not reported to have any adverse

effects when led by trained individuals. Even so, practitioners and pregnant women would probably welcome a more thorough examination of whether such interventions are truly effective at helping to reduce anxiety during pregnancy. Also, there seems to be very little high-quality evidence about the effects on perinatal outcomes and no evidence about the long-term effects of mind-body interventions during pregnancy. Any future research studies should certainly look to incorporate measurement of those outcomes as well as the immediate effect on anxiety levels.

### Key points

- Anxiety during pregnancy is increasingly being recognised as a condition worthy of attention as it is associated with subsequent health problems and developmental difficulties, including postnatal depression in women and behavioural and emotional problems in children.
- Some mind-body interventions might be useful for reducing anxiety during pregnancy and improving perinatal outcomes, but there is currently insufficient high-quality evidence to draw firm conclusions, and little or no evidence to draw conclusions about longer-term effects.
- There is no evidence of any harmful effects from any mind-body interventions during pregnancy.

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