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The Application of Hypnosis in Obstetrics

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Abstract: Hypnosis, the induction of a naturally relaxed state of mind and body, is most commonly practiced by pregnant women in preparation for the childbirth experience. A literature review was performed to assess the effects of hypnosis before, during and after pregnancy. The majority of data is extracted from case series and low-quality studies thereby limiting the acceptability of hypnosis for various pregnancy related conditions. A few well-designed studies show that self-hypnosis may be beneficial for mitigating labor pain and fear of childbirth. Women can safely pursue hypnotherapy during pregnancy; however, high quality trials are needed to demonstrate its complete efficacy.

Key words: hypnosis, hypnotherapy, pregnancy, postpartum, hypnobirth

Introduction

"You are getting sleepy…very, very sleepy…" Stage hypnosis has popularized the association of hypnosis with "casting a spell" on entranced individuals for the sake of entertainment. The common misperception of hypnosis involves being controlled by someone else, losing self-control, a state of unconsciousness or being asleep. The reality is that hypnosis is a natural state of mind in which the body and mind are relaxed, and the mind is highly aware and focused, in total control and able to accept or reject suggestions.

The American Psychological Association's widely cited definition describes hypnosis as "a procedure, or the state induced by that procedure, in which suggestion is used to evoke changes in sensation, perception, cognition, emotion, or control over motor behavior. Subjects appear to be receptive, to varying degrees, to suggestions to act, feel, and behave differently than in an ordinary waking state."[1] A hypnotist serves as a guide and initiates the procedure by asking the subject to focus their attention on the hypnotist's voice and calming imagery. Individuals can be taught to enter a hypnotic state by themselves, often with the assistance of guided audio recordings. As the subject

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deepens their focus on the hypnotist's instruction, the subject's mind blocks out other sensory data and becomes less aware of their environment leading to a deeply relaxed state.

A hypnotic state has been described as a trance, a state of heightened focus, a relaxed state, and a dissociative state.[2] The aim of hypnosis is to allow subjects to alter their traditional holistic consciousness, segregating experiences that would normally be processed together, and temporarily suspending higher order cognitive structures to enable the unconscious mind to become open to suggestion. Subjects undergo physiological changes, which may include relaxed muscles, immobility, altered breathing and pulse, fixed gaze, delayed response, amnesia and time distortion.[2] Subjects are always in full control of when he/she enters and exits hypnosis.

Hypnosis in Obstetrics

Medical hypnosis, also termed as clinical hypnosis or hypnotherapy, is the clinical application of hypnosis to medical disorders and procedures. Hypnosis was initially introduced for pain control during surgery in the mid-1800s. It was not until the 1950s when the scientific application of hypnosis was reported for pregnancy, even though hypnosis was already being used for childbirth. In 1958, the American Medical Association endorsed hypnotherapy as an orthodox medical treatment, as opposed to an "alternate" or "complementary" therapy.[3] Scientific organizations, including the National Institute of Health and American Psychological Association, have since endorsed hypnosis for the management of several medical conditions including acute and chronic pain, gastrointestinal disorders, weight control, and psychotherapy. The American Society of Clinical Hypnosis lists hypnosis for the medical use of nausea and vomiting in pregnancy (hyperemesis gravidarum) and for labor analgesia during childbirth.[4]

Hypnosis is a safe and unintrusive procedure. There are no associated risks, unwanted side effects or teratogenic risks associated with hypnosis in pregnancy because it is simply a relaxation technique. There are no clear or specific contraindications to practicing hypnosis. Caution should be used for individuals who have active psychosis, hallucinations or abuse alcohol or drugs.[5] Hypnosis experience before pregnancy is not required; it can easily be learned during pregnancy. Behavior changes are common and women are believed to be more susceptible to hypnosis during the prenatal period.[6]

Hypnosis and Infertility

Anxiety and stress are common during the process of embryo transfer (ET), a crucial event during the invitro fertilization (IVF) process. Relaxation techniques implemented around the time of ET may reduce catecholamine secretion and improve uterine relaxation, which may translate into better success rate of IVF. In Israel, Levitas et al[7] compared 89 couples with 98 total IVF/ET treatment cycles in women who engaged in hypnosis to 96 IVF/ET cycles of matched controls (matched for patient's age, number of oocytes retrieved, and number and quality of embryos transferred). Hypnosis began ~10 minutes before the ET was performed and continued during and after the procedure was completed. Baseline characteristics including the type of infertility (male factor, pelvic and tubal factor and unexplained) were similar between the 2 groups with the exception of the rate of primary infertility which was significantly higher in the control group (hypnosis: 46.9%, control: 74.2%, $P < 0.001$). The implantation rate, clinical pregnancy rate per patient and per cycle were significantly higher in the hypnosis group when compared with the control group. A regression analysis was performed to assess factors that may have

impacted conception rates; hypnosis remained a significant factor for the increased pregnancy rate in the hypnosis group [odds ratio 7.58; 95% confidence interval (CI): 1.82-29.9].[7]

A small randomized trial conducted in France[8] compared the effects of hypnosis plus lactose (lactose served as a diazepam placebo) to diazepam 10 mg plus muscle relaxation (muscle relaxation served as a hypnosis placebo) on success rates of ET. Medication was administered 90 minutes before the procedure and relaxation techniques were implemented 10 minutes before ET and continued during and for 10 minutes after the procedure was completed. Hypnosis cues included focusing on a color changing egg, a stair metaphor, and welcoming a long-awaited friend. The rates of pregnancy and delivery were similar between both groups. Anxiety was assessed by the State and Trait Anxiety Index before and after ET. Low levels of anxiety were noted in both groups before the procedure [hypnosis: 37.5 (8.1), diazepam: 38.7 (9.9), $P > 0.05$] with a nonsignificant reduction in anxiety after the procedure between the groups [hypnosis: 25.9 (7.2), diazepam: 25.5 (5.6), $P > 0.05$].[8] Due to the lack of a control group that did not receive any type of relaxation therapy for comparison, both hypnosis and diazepam appear to be effective in reducing anxiety associated with ET. Neither of these studies assessed the effects of hypnosis on uterine contraction rates—the proposed hypothesis on how hypnosis is useful during ET.

Beyond these 2 studies, a few case reports have been published describing the experiences of women with unexplained infertility becoming successfully pregnant after engaging in hypnosis.[9] There are currently no prospective or randomized trials assessing the utility of hypnosis on infertility. Of note, Hypnobabies offers an online hypnosis fertility program consisting of 4 audio tracks focused on deep relaxation.[10]

Hypnosis in the First Trimester

Marc et al[11] from Canada conducted a pilot randomized trial assessing the utility of hypnosis in pain management during an elective first trimester termination. Fifteen women were randomized into either the hypnosis or standard care group. A hypnotherapist initiated the process 20 minutes before moving the patient to the operating room. She accompanied the patient during the procedure and continued the hypnotic dialog until the procedure was complete. The standard care group was accompanied by a relative or friend for 20 minutes before the procedure and subsequently attended to by the family planning nurse during the procedure. All patients received a paracervical block, preoperative oral naproxen 100 mg and lorazepam 1 mg. The participants in the hypnosis group requested nitrous oxide for pain control significantly less frequently than the control group (hypnosis: 36%, control: 87%; $P = 0.008$). However, there was no significant difference between groups in procedure time, self-reported pain and anxiety levels during the procedure.[11]

On the basis of these results, the same authors conducted a larger randomized trial to determine whether hypnotic analgesia resulted in more pain and anxiety during the surgical procedure, despite the decrease in request for pain medication.[12] A cohort of 350 women were randomized to receive the same intervention, however, the outcome of interest was the utilization of intravenous pain medications instead of inhaled nitrous oxide for pain control. The number of patients who requested at least 1 dose pain medications was significantly lower in the hypnosis group (hypnosis: 63%, control: 85%; $P < 0.0001$). Anxiety and pain were assessed at 4 time points: at baseline, beginning of surgery (installation on the table and manual pelvic exam), first suction evacuation, and at recovery. Anxiety levels were significantly lower at the beginning of the surgery in the hypnosis group ($P < 0.0001$) but not at any other time points.[12]

Hypnosis for Nausea and Vomiting

Nausea and vomiting are common, self-limiting symptoms in the first trimester of pregnancy affecting 50% to 80% of women.[13] The more severe but less frequent form, hyperemesis gravidarum, is often resistant to conventional medical therapy, leaving women amenable to alternative management options. While the exact cause of hyperemesis is unknown, some theories suggest underlying psychological disorders, anxiety and past traumas as leading factors. The suggestion for the clinical use of hypnosis for hyperemesis in pregnancy dates back to the 1940s. Kroger and DeLee[14] described a case series of 21 American women affected by varying degrees of resistant symptoms who underwent hypnosis with either direct suggestions or with hypno-analysis and age regression. Very limited information was provided regarding the number of hypnosis sessions, symptom assessment and relevant obstetric details for the cohort, however, they reported complete resolution of symptoms in 19 (90%) women (self-reported).

Since that publication, several case series have been published, but there have been no randomized or prospective trials to assess hypnosis for hyperemesis or nausea and vomiting in pregnancy. The largest case series from Israel[15] published in 1980 included 138 patients who fit the clinical criteria for hyperemesis gravidarum, failed conventional therapy and were up to 16 weeks gestational age. Women received 1 to 3 sessions of hypnotic relaxation or hypnotic imagination lasting 45 to 60 minutes, delivered in either a group session or as individual therapy. Excellent response, defined as complete resolution of nausea and vomiting, occurred in 35 (69%) women who received individual hypnotherapy and 61 (70%) who received group therapy. If women who had a good response (defined as resolution of vomiting but persistence of nausea) were included, the response rate rose to 72% (n = 37) for individual hypnotherapy and 97% (n = 85) in group therapy. An absence of improvements in symptoms with hypnosis occurred in 2.3% of this cohort.[15]

Other cases series, ranging from 1 to 12 patients, describe similar beneficial effect of hypnosis for hyperemesis.[2,16–19] A variety of hypnosis scripts are described in each publication; these include progressive muscle relaxation, discomfort relief, ego strengthening, ideomotor questioning, psychosocial self-regulation, cognitive restructuring, and guided imagery.[2,17–19] Most of these authors report choosing these techniques based on the belief that hyperemesis is rooted in unaddressed past psychological trauma which can be addressed through hypnosis. Although hypnosis appeared to improve symptoms for these patients, these case reports have several shared limitations, including a lack of a control group for comparison leading to suboptimal assessment of the true effects of hypnosis. In addition, all studies failed to clearly report the gestational age of symptom resolution which makes it difficult to know if symptom resolution occurred due to the natural progression of the disease or due to the hypnosis intervention. Lastly, limited details on the remainder of the pregnancy were reported, including recurrence of symptoms and outcomes data. Although the current data is encouraging, contemporary data by well-designed studies such as a randomized trial should be undertaken to validate these findings.

Hypnosis for the Breech Fetus

Breech presentation at term occurs in ~3% to 4% of pregnancies.[20] An external cephalic version (ECV) is frequently offered in an attempt to mitigate the need for delivery by cesarean section. The success rate of ECV varies but is reported to be around 50% and is associated with risks such as temporary or persistent fetal heart rate changes and rare events such as placenta abruption, prema-

ture rupture of membranes, umbilical cord prolapse, and stillbirth.[20] Other techniques beyond ECV, such as acupuncture, acupressure, and moxibustion, have been studied with conflicting success.[21]

Some theories for a breech fetus include stress, tension in muscles specifically the lower uterine segment, and activation of sympathetic nervous system. Therefore, relaxation techniques such as hypnosis may provide benefit. A prospective case series compared 100 women with breech fetuses at 37 weeks or greater who underwent hypnosis with 100 controls who were matched for maternal age, gestational age, parity, race, and obstetrical risk status.[22] Hypnosis sessions were typically 1 hour in duration and were provided for up to 10 in-person hours with the hypnotherapist and also available on audio for a home practice. Seventy percent of subjects received <4.5 hours of individualized hypnosis and 28% had only 1 session. Success of hypnosis was defined as spontaneous conversion to vertex at any time after the first hypnosis session and remained vertex at the time of delivery. The rate of spontaneous conversion was significantly higher with hypnosis (81% vs. 26% in the control group; *P*-value not provided). There was no significant difference in infant outcomes (birth weight, Apgar scores, rate of neonatal resuscitation), however, the rate of cesarean delivery was significantly lower in the hypnosis group (*P*-value not provided).[22]

Reinhard et al[23] implemented a 20-minute hypnosis session immediately before performing an ECV after 37 weeks. When compared with historically matched controls, the success rate of ECV was higher with hypnosis (41.6% vs. 27.3% of controls; $P < 0.05$). Moreover, when the same authors compared hypnosis, neurolinguistic programming and controls, there was no longer a significant difference in ECV success rates with hypnosis.[24] Well-designed clinical trials are needed to confirm these findings, however, in the interim, hypnosis can be considered for breech conversion.

Hypnosis and Preterm Labor

Preterm birth is one of the leading causes of neonatal mortality. Case reports from the 1960s briefly describe success with cessation of preterm labor from hypnosis in a small cohort of women.[25] Since then, only 1 study published in the 1980s evaluated the effects of hypnosis as an adjunct to preterm labor treatment. Omer et al[26] compared hypnotic relaxation and medical management in 39 women to 74 retrospectively matched controls who received only medical management for symptoms of preterm labor requiring hospitalization between 26 and 34 weeks. All treatment was initiated within 3 to 14 hours of admission; 1 to 3 or more hypnosis sessions were conducted in person, each lasting ~90 minutes. Participants were also given an audio tape to listen to twice a day during hospitalization and once daily until the end of 37 weeks. While trends favored hypnosis, there were no statistically significant differences ($P = 0.11$) between groups for those who delivered within 2 weeks of treatment (hypnosis 10.3%, control 21.6%), between 2 weeks of treatment up to 37 weeks of pregnancy (hypnosis 28.2%, control 36.5%), or those who delivered after 37 weeks gestation (hypnosis 61.5%, control 41.9%).[27] The rate of pregnancy prolongation, defined as the lag time between onset of treatment and date of delivery/lag time between onset of treatment and expected date of delivery (×100%), was the primary outcome set by the authors. The mean rate of pregnancy prolongation was significantly longer in the hypnosis group (hypnosis 74.2%, control 55.4%, $P < 0.002$).[27] No further data was provided on the gestational age of diagnosis, treatment or delivery, the rate of outpatient compliance with hypnosis,

or management of preterm labor, thereby limiting the applicability of this study to a contemporary population. Further research is needed to assess if hypnosis is beneficial in the management of preterm labor.

Hypnosis and Labor Pain

The strong historical link of hypnosis with anesthesia led to the consideration of hypnotic analgesia as one of the most dramatic of all hypnotic phenomena. The universality of labor pain, which can be the root for fear and anxiety surrounding childbirth, makes it one of the most studied settings for hypnosis related to pregnancy. The first randomized controlled trial (RCT) by Freeman et al[28] in 1986 specifically assessing the use of epidural anesthesia, was not able to demonstrate a beneficial effect of hypnosis on control of labor pain when compared to a control group; there was no significant difference in women who received an epidural or pethidine for pain relief between 2 groups. Subsequently, well-designed and adequately powered randomized trials have been conducted and continue to conclude no difference in epidural use during labor with hypnosis (Table 1).[28–32]

In 2016, a Cochrane Review[33] performed an analysis of 2916 women which included several of the studies from Table 1 (note: several studies included in the Cochrane review were excluded from Table 1 due to lack of clarity in methods or results). The meta-analysis concluded that women in the hypnosis group were less likely to use pharmacological pain relief or anesthesia during labor [average risk ratio (RR) 0.73, 95% CI: 0.57-0.94; very low-quality evidence]. However, there was no clear difference in the proportion of women receiving an epidural when the hypnosis group was compared with any control group (average RR: 0.81, 95% CI: 0.51-1.27, 6 studies, 2817 women). A further subanalysis parsed out the studies based on the control group used for comparison which consisted of either standard care, supportive counseling, or relaxation. No clear difference was found between the hypnosis and standard care or relaxation groups in the use of pharmacological pain relief or anesthesia during labor, however, women in the hypnosis group were less likely to use pharmacological pain relief or anesthesia during labor when compared with women receiving supportive counseling (average RR: 0.48, 95% CI: 0.32-0.73, 2 studies, 562 women).[33] The variability in the conclusions of these studies highlights the importance of control groups for comparison. Hypnosis may be effective in reducing the use of pharmacological agents for pain control during labor, however, it does not reduce epidural use.

Hypnosis and Childbirth Experience

Childbirth is one of the most physically and mentally demanding experiences in a woman's life, leading to an increase in fear associated with the process of labor and delivery. Fear of childbirth (FOC) is more common in nulliparous women; however, other factors such as previous mode of delivery, depression, low social support, pain and loss of control contribute to higher levels of FOC.[34] FOC in relation to hypnosis has been assessed in 3 RCTs. At the initiation of 1 study, Werner et al[35] (Table 1) implemented the Wijmas Delivery Expectancy/Experience Questionnaire version A (W-DEQ A) which assesses fear, confidence and expectations of the upcoming childbirth. Version B (W-DEQ B) was completed at 6 weeks postpartum which assessed the same aspects of the actual childbirth experience. At baseline, the W-DEQ A scores were comparable between the hypnosis, relaxation and usual care group. After delivery, the mean score on the W-DEQ B

TABLE 1. Randomized Controlled Trials Assessing the Effects of Hypnosis on Analgesic Use in Labor

Reference, Country	Sample Size, Population	Hypnosis Intervention	Comparison Group(s)	Primary Outcome	Results
Rock et al,[29] USA	Hypnosis: 22 Control: 20	Hypnosis offered during labor by a medical student hypnotist (average: 45 min)	Routine care	Success of hypnotic techniques	Hypnosis group required significantly smaller amounts of analgesics than controls ($P < 0.05$) Demerol use: Hypnosis 62%, mean dosage 46 mg; Control: 94%, mean dosage 76 mg Demerol and tranquilizer use: Hypnosis 52%, mean tranquilizer dosage 29 mg Control 76%, mean tranquilizer dosage 40 mg
Freeman et al,[28] UK	Hypnosis: 29 Control: 36	Weekly hypnosis from 32 wk +routine weekly antenatal classes	Routine weekly antenatal classes	Analgesic requirement	No significant difference* in: Epidural use (hypnosis 27%, control 25%), Pethidine use (hypnosis 52%, control 56%), or nil/nitrous oxide (hypnosis 21%, control 19%)
Werner et al,[30] Denmark	Hypnosis: 493 Relaxation: 494 Control: 230 Nulliparous women	3 consecutive 1 h classes+ 3 20 min audio recordings for labor	Control: usual care Relaxation group: 3, 1 h antenatal classes+audio recordings for homework and labor	Epidural analgesia use	No significant difference* in epidural use Hypnosis 31.2% (95% CI: 27.1-35.3), Relaxation 29.8% (95% CI: 25.7-33.8), Control 30.0% (95% CI: 24.0-36.0)
Cyna et al,[31] Australia HATCh study	Hypnosis +CD: 154 CD only: 143 Control: 151	Three consecutive classes as close to 37 wk as possible+daily home practice with a hypnosis audio recording (CD) (recordings were 18-32 min in duration)	Control: usual care CD only: Hypnosis CD administered by a nurse with no training in hypnotherapy	Use of pharmacological analgesia (including inhaled nitric oxide, parental opioids, and/or epidural analgesia)	No significant difference in: Pharmacological analgesia use (hypnosis 81.2%, control 76.2%, $P = 0.34$; RR: 1.07, 95% CI: 0.95-1.20) Epidural use (hypnosis 51%, control 44.1%, $P = 0.49$, RR: 1.08, 95% CI: 0.86-1.36) Hypnosis adherence: <50% attended all 3 classes

Downe et al,[32] UK SHIP study	Hypnosis: 337 Control: 355 Nulliparous women	Two, 90 min group sessions held at 32 and 35 wk gestation+26 min self-hypnosis audio recording (CD) daily until delivery	Usual antenatal care	Epidural analgesia use	No significant difference* in epidural use Hypnosis 27.9%, Control 30.3% (OR: 0.89, 95% CI: 0.64-1.24) Hypnosis adherence: 92% attended session 1, 85.4% attended session 2, 84.5% attended both Median time spent practicing hypnosis: 624 min (IQR: 428-940 min) Median practice sessions 24 (3×/wk)

**P*-value not provided.

CD indicates compact disk; CI, confidence interval; IQR, interquartile range; OR, odds ratio; RR, relative risk.

scale was significantly lower in the hypnosis group compared with the other 2 groups, indicating a better childbirth experience [mean (SD) score: hypnosis 42.9 (23.5), relaxation 47.2 (25.0), usual care 47.5 (22.7), $P = 0.01$]. Subgroup analysis revealed a difference by mode of delivery: women in the hypnosis group who had a vaginal or spontaneous delivery had a statistically significant better childbirth experience ($P = 0.01$ and 0.04, respectively) compared with the other groups. There was no difference between groups for those who had an assisted vaginal birth or emergency cesarean section.[35]

Atis and Rathfisch[36] also reported a significantly lower mean scores on the W-DEQ B scale in 30 women who had hypnobirthing training compared with 30 women who received routine care (hypnosis: 16.47 ± 7.21, control: 95.47 ± 22.64, $P = 0.00$). In the SHIP study by Downe et al,[32] hypnosis patients reported a greater reduction in level of anxiety and fear than anticipated during labor and actually experienced in labor when compared with the control group (*P*-value not provided). Questionnaires used for this study were a mix of validated instruments —the exact survey that assessed fear of labor was not clearly defined. A systematic review assessing interventions for reducing FOC concluded that hypnosis is associated with a 1.5 times reduction in the chance of FOC based on analysis of these 2 studies.[34]

Currently there are no RCTs assessing the effects of hypnosis on childbirth outcomes as a primary outcome of the study. Although not adequately powered to detect a difference, several studies have assessed childbirth outcomes as secondary outcomes. A meta-analysis of hypnosis RCTs revealed no significant differences in the proportion of women who engaged in hypnosis versus any control group for the following: mode of delivery (rates of spontaneous vaginal delivery, assisted vaginal delivery or cesarean section), preterm birth, induction of labor, labor length, primary postpartum hemorrhage, breastfeeding rates or postpartum depression.[33] Neonatal outcomes, such as neonatal intensive care unit admission rates or Apgar score of <7 at 5 minutes also did not differ.[33]

Hypnosis and Induction of Labor

The relaxation properties of hypnosis may be beneficial for women with

extreme anxiety about childbirth who impede labor onset by inhibiting oxytocin production required to initiate contractions. Case reports from the 1960s describe success of initiating contractions within 15 to 30 minutes of inducing a light trance and providing suggestions to recall the feeling of uterine contractions from previous experience.[37] Interestingly, preterm patients were considered as failures in response to treatment as they did not begin to contract in response to hypnotic suggestions.[38] A 2014 Cochrane review[39] searched all published and unpublished RCTs assessing the effect of hypnosis for induction of labor as a primary outcome. Currently, there are no RCTs or cluster-RCTs available to assess the effectiveness and safety or efficacy of hypnosis for induction of labor.[39]

Hypnosis and Postpartum Depression

Studies assessing the benefits of hypnosis on anxiety, stress or depression either during the antenatal period or postpartum period are limited. Depression was considered a contraindication for much of the last century due to a concern for an increased risk of suicide, however, more recent studies have shown a beneficial effect for depressive symptoms when treating for other disorders such as anxiety or chronic pain.[40] As per 2012 Cochrane review, there are currently no RCTs evaluating the effects of hypnosis on preventing or treating postpartum depression.[41] No studies have evaluated the effects of a hypnotic intervention in the postpartum period, however, 1 study assessed the effects of antenatal hypnosis on postpartum depression as a secondary outcome of the main study. Beevi et al[42] conducted a quasi-experimental study comparing hypnosis sessions held at 4 time points in pregnancy (16, 20, 28, and 36 wk) with encouragement of a home self-hypnosis practice to a control group. The Depression, Anxiety, Stress Scale (DASS-21) instrument was completed at each hypnosis visit and the DASS-21 and Edinburg Postnatal Depression Scale (EPDS) questionnaires were completed at 2 months postpartum. The response rate in the postpartum period was 53% of the original sample (hypnosis: 16 respondents, control: 11 respondents). At 2 months postpartum, the women who participated in hypnosis had a significantly lower score for anxiety [hypnosis: mean (SD): 2.88 (3.01), control: 38.36 (58.81); $P = 0.023$] and depression [hypnosis: 1.25 (2.41), control: 6.73 (5.68), $P = 0.002$]. A score of 10 or greater on the EPDS survey indicating depression was noted in 6.25% (n = 1/16) of the hypnosis group versus 81.8% (n = 9/11) of the control group (statistical analysis not provided).[42] The small sample size and unusually high rate of postpartum depression in the control group may explain the asymmetry in the data results. Unfortunately, no further analysis was provided regarding DASS-21 scores during other time points in pregnancy in comparison to the postpartum period, baseline EPDS scores, or compliance with self-hypnosis home practice. While the results of this study are in favor of a hypnotic intervention during pregnancy, further well-designed studies are needed.

Hypnosis for High Risk Pregnancies

High risk pregnancies can benefit from CAM therapies however, these women are often excluded from studies for various reasons. The literature to support the use of hypnosis in high risk pregnancies is limited.

Tobacco and nicotine use in any format such as cigarettes, e-cigarettes, vaping products or hookah, are discouraged during pregnancy and the postpartum

period. The known perinatal risks associated with tobacco use in pregnancy include orofacial clefts, fetal growth restriction, placental abruption, premature rupture of membranes, low birth weight, and increased perinatal mortality.[43] Counseling and pregnancy-specific materials are effective cessation aids with reportedly up to 50% of women stopping smoking during pregnancy.[43] In 1996, Valbo and Eide[44] published a study assessing the effects of hypnosis in a Norwegian population that reported a smoking rate of 35% during pregnancy. One hundred thirty women were randomized into either 2, 45-minutes hypnosis sessions at 20 weeks in pregnancy or to receive routine prenatal care. There was no significant difference in cessation or quit rates between the 2 groups (rate was 10% in each group; *P*-value not provided).[44] No further studies have been published on the utilization of hypnosis as a therapeutic agent in smoking cessation during pregnancy.

Insufficient fetal growth, also termed intrauterine growth restriction (IUGR), affects ~10% of pregnancies and can be the result of a variety of maternal, fetal and placental factors.[45] Suboptimal placental perfusion accounts for ~25% to 30% of cases and may be influenced by psychological stressors during pregnancy. A small randomized pilot study from India consisting of 20 women per group assessed the effects of hypnosis on women who had a pregnancy affected by IUGR and low amniotic fluid diagnosed after 20 weeks when compared with a control group with the same diagnosis.[46] An obstetrician trained in clinical hypnosis provided individualized 40-minute guided hypnosis sessions twice a week for the first 4 weeks followed by weekly sessions until delivery. Both groups received conventional medical management consisting of daily fetal kick counts, twice weekly cardiotocography monitoring and weekly ultrasound examinations. Approximately 72.5% of women were 29 to 34 weeks pregnant at the time of enrollment. The women in the hypnosis group were significantly more likely to delivery at full term [hypnosis: n = 14 (70%), control: n = 5 (25%), $P = 0.004$] and have a birth weight of > 2000 g [hypnosis: n = 12 (60%), control: n = 4 (20%), $P = 0.009$].[46] This study based its approach on hypnosis leading to uterine relaxation and improved placental circulation, however, the etiologies of IUGR in each case were not clearly established. Further studies are recommended to validate the utility of hypnosis in the management of IUGR.

Established Hypnosis Programs

Currently, the 2 most widely available hypnosis programs for birth in the United States are Hypnobabies and HypnoBirthing. Hypnobabies was founded by Kerry Tuschhoff, a certified hypnotherapist, childbirth educator and hypno-doula. This program is based on the principles from Gerald Klein Painless Childbirth Program, and focuses on creating deep, somnambulistic hypnosis that produces "hypnoanesthesia."[47] It is offered in 2 formats: 6, 3 hours/week, in-person training sessions led by certified Hypnobabies Childbirth Educators; or, a 6-week online home study course that includes an online childbirth curriculum and 19 hypnosis audio tracks and birth affirmation audio files. Participation of the birth partner in the preparation and delivery process is highly encouraged.[47] More information is available at www.hypnobabies.com/.

Hypnobirthing, the Mongan Method, was established in 1989 by a clinical hypnotherapist, Marie Mongan. The principles of this method are based on the teachings of natural childbirth pioneer, Grantly Dick-Read, from the UK.[48] This program is conducted through live, in-person classes with local Hypnobirth-

ing Childbirth Educators and consists of 5, 2.5-hour classes over a 5-week period. For women who cannot attend a live class, the Hypnobirthing book is available for self-study. Resources including relaxation and guided imagery audio tracks, birthing DVDs with birth affirmations, images, birth stories and music are provided for review.[48] More information is available at https://us.hypnobirthing.com/.

To date, there are no published clinical trials that assess the efficacy of either of these 2 programs within an American population. Their respective websites provide only anecdotal evidence, birth stories and testimonials speaking to success stories achieved by participants. It is possible that these programs may have better outcomes than currently published studies due to the number of hours of training and the emphasis on practicing the techniques daily until birth, however, this has yet to be demonstrated empirically.

Limitations of Hypnosis Research

Methodological assessment in studies for hypnosis is challenging regardless of the targeted application or health outcome. Using a standardized script so that hypnotic intervention is uniform allows for adequate control in a research study but may not be sufficient to address individual needs that may influence the response to hypnosis. Not only should preconceived notions about hypnosis be addressed before attempting hypnosis, but addressing underlying psychological issues is an important component contributing to the success of a hypnotic intervention.

The majority of published studies, to date, assess the acute, short term effects of hypnosis by implementing an intervention at the time of outcome assessment or within a few weeks of delivery. Perhaps the duration of practice is an important component of the intervention that should be assessed in future studies.

Summary

Hypnosis, the induction of a naturally relaxed state of mind and body, is most commonly practiced by pregnant women in preparation for the childbirth experience. The literature to support its benefit are limited; the majority of data are extracted from case series and low-quality studies; however, a few well-designed studies show that self-hypnosis may be beneficial in labor. There are no known side effects associated with hypnosis and it is considered a safe option for low-risk pregnant women. A Cochrane Review subgroup analysis cautiously concluded that the use of pharmacological analgesia may be lower when women commence hypnosis in the first or second trimester or if they attend 4 or more hypnosis sessions.[33] Thus, based on this and other studies, the literature suggests that women can be counseled to pursue hypnotherapy training during pregnancy and to initiate a daily practice as early as they desire in pregnancy.

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