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Self-hypnosis for coping with labour pain: a randomised controlled trial

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Objective To estimate the use of epidural analgesia and experienced pain during childbirth after a short antenatal training course in self-hypnosis to ease childbirth.

Design Randomised, controlled, single-blinded trial using a three-arm design.

Setting Aarhus University Hospital Skejby in Denmark during the period July 2009 until August 2011.

Population A total of 1222 healthy nulliparous women.

Method Use of epidural analgesia and self-reported pain during delivery was compared in three groups: a hypnosis group receiving three 1-hour lessons in self-hypnosis with additional audiorecordings to ease childbirth, a relaxation group receiving three 1-hour lessons in various relaxation methods and mindfulness with audiorecordings for additional training, and a usual care group receiving ordinary antenatal care only.

Main outcome measures Primary outcome: Use of epidural analgesia. Secondary outcomes included self-reported pain.

Results There were no between-group differences in use of epidural analgesia—31.2% (95% confidence interval [95% CI] 27.1–35.3) in the hypnosis group, 29.8% (95% CI 25.7–33.8) in the relaxation group and 30.0% (95% CI 24.0–36.0) in the control group. No statistically significant differences between the three groups were observed for any of the self-reported pain measures.

Conclusion In this large randomised controlled trial of a brief course in self-hypnosis to ease childbirth, no differences in use of epidural analgesia or pain experience were found across study groups. Before turning down self-hypnosis as a method for pain relief, further studies are warranted with focus on specific subgroups.

Keywords Antenatal training, childbirth, epidural analgesia, hypnosis, labour pain.

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Introduction

Labour pain is a challenge to parturient women, being described as severe or extremely severe,[1] and is one of the most important factors shaping women's assessment of their childbirth.[2,3] Pain can lead to such a negative experience that it may result in postpartum depression, post-traumatic stress syndrome, future caesarean section or a reluctance to have more children.[4–7] The pain experience is complex and influenced by various factors, including emotional reactions,[8,9] and high levels of fear and anxiety are important factors in a woman's interpretation of labour pain and childbirth.[2,3]

Pharmacological methods for relieving birth pain are limited by the ability of most drugs to pass the placenta and enter the fetal circulation.[10] Epidural analgesia is considered the most effective pain relief method, although it has been associated with adverse effects such as instrumental deliveries, longer second stage of labour, fever and neurological injuries in the mother,[11,12] as well as disturbed behaviour in the newborn with effects on breastfeeding, temperature regulation and crying.[13] These potential adverse effects have spurred interest in exploring nonpharmacological methods suitable for women in labour, e.g. relaxation, breathing techniques, positioning, acupuncture and hypnosis.[14,15]

Pain in general has been managed using hypnosis for more than a century and hypnosis has been shown to influence experimental and clinical acute and chronic pain.[16–19] Although misconceptions and prejudices have prevailed,

the hypnotic state appears to be a common and natural mental state, often described as 'an altered state of consciousness characterised by markedly increased receptivity to suggestion, the capacity for modification of perception and memory, and the potential for systematic control of a variety of usually involuntary physiological functions'.[20] Hypnosis typically involves a hypnotist and a person being hypnotised, but can also be induced by individuals themselves through self-hypnosis after having been trained to guide themselves through a hypnotic induction procedure.[21]

Hypnosis and self-hypnosis has previously been used successfully as antenatal training in different study populations and cultures, including adolescents and vulnerable women.[22,23] Over the years, several studies have also demonstrated beneficial effects of teaching pregnant women in the general population self-hypnosis when preparing for childbirth.[22–33] The results suggest that hypnosis may have a positive impact on labour pain,[22,24–32,34] but in most available studies the intervention was not randomly assigned, the hypnotic method is not well described and the number of participants is relatively small. We therefore conducted a randomised controlled trial to examine the effect of training in self-hypnosis on the use of epidural analgesia during birth and self-reported labour pain. We hypothesised that women undergoing a short antenatal course in self-hypnosis to ease childbirth would use epidural analgesia less frequently than women participating in a short course in relaxation and awareness training and than women receiving the usual antenatal care. We also expected self-hypnosis training to improve the pain experience during childbirth.

Methods

Design

The study took place in Denmark at Aarhus University Hospital, where the obstetrics department has about 5000 deliveries per year. Participants were recruited from July 2009 through to May 2011 and gave birth from August 2009 to August 2011. The trial was randomised, controlled, single-blinded and used a three-arm group design consisting of an intervention group, an active comparison group, and a control group receiving ordinary antenatal care.

Participants

All women referred to the Obstetrics Department at Aarhus University hospital for childbirth are offered an ultrasound scan at 19 weeks of gestation. More than 95% of pregnant women accept this offer. We used the booking lists to identify women who fulfilled the following eligibility criteria: no chronic diseases, uncomplicated pregnancy, nulliparous, older than 18 years, and able to understand and speak Danish. An invitation including written information about the study was mailed to 3554 women at around 28 weeks of gestation. We also placed posters at the Obstetrics Department and at the Midwifery Clinics affiliated to Aarhus University Hospital. Oral information was given to all responding women, followed by a written consent if the woman decided to participate. The women then completed a web-based questionnaire with baseline health information, and if they fulfilled the eligibility criteria, they were randomised. A total of 1222 women were randomised (Figure 1).

Randomisation

The participants were randomly allocated to either an intervention group ($n = 497$), an active comparison group ($n = 495$), or a control group ($n = 230$) using a computer-generated interactive voice-response telephone randomisation system.[35] The randomisation programme used the participant's unique personal identification number, which ensured that the participant could only be randomised once. The programme used varying block sizes of 2, 4 and 6 assigning the participants with a ratio of 1:1:0.45. Each randomisation was carried out by the principal investigator.

Intervention

The hypnosis group attended three 1-hour classes on self-hypnosis for childbirth held over three consecutive weeks. A test for hypnotic susceptibility[36,37] was conducted during the first session, which therefore lasted 2.5 hours. Inspired by the Australian HATCh project,[1] a programme was developed and taught by two midwives trained in hypnosis. The programme included three audiorecordings including a 20-minute section especially meant for labour.

The active comparison group (named 'the relaxation group' in the following) also attended three antenatal classes, each lasting 1 hour. The programme was taught by the same midwives as in the intervention group and included a variety of body awareness, relaxation and mindfulness techniques. This course also included audiorecordings for homework and labour.

The usual care group received only ordinary antenatal care, which included a nuchal translucency scan at about 12 weeks of gestation, an anomaly scan at about 19 weeks of gestation, four to five visits at the midwifery clinics, and a tour of the birth department.

A detailed description of the intervention can be found as supplementary material to the web-based version of the article (see Supporting Information, Appendix S1).

Blinding

The project was presented to the participants and the staff at the Obstetrics Department as a research project on mind–body training investigating self-hypnosis and

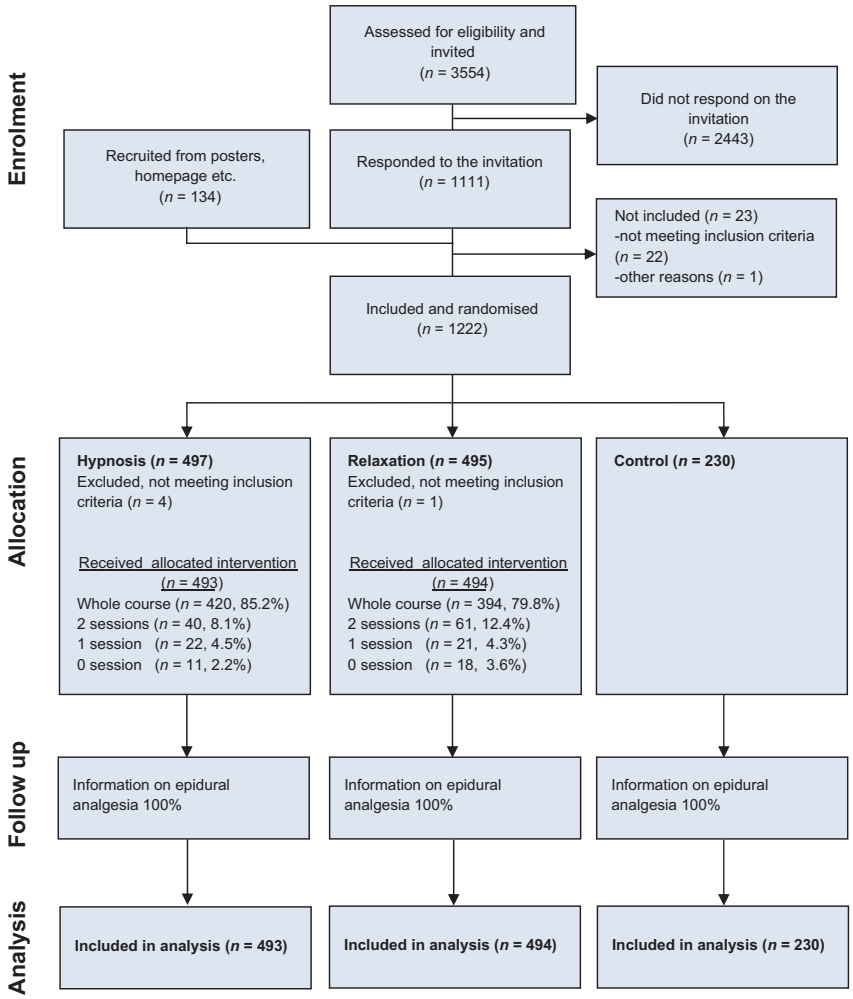

Figure 1. Flowchart.

relaxation techniques as two equally effective approaches. The midwives assisting the birth were blinded to the participant's allocated treatment. To examine the effectiveness of the blinding, we collected information about the midwives' estimation of the woman's allocated treatment immediately after the delivery.

Information about the participant's allocated treatment was removed from the data set, so that data management could be performed without knowledge of the participant's allocated treatment.

Measures

The primary endpoint was the use of epidural analgesia during birth. Self-reported pain was examined as a secondary outcome.

Use of epidural analgesia and other information about the delivery derived from 'The Aarhus Birth Cohort', which is an ongoing collection of data on all births at the hospital. In case of missing information or if the woman gave birth at another hospital, we extracted the necessary data from medical records.

Baseline information and data on self-reported pain were collected by questionnaire. The first questionnaire was completed at recruitment and included among others: The Ten-item Perceived Stress Scale,[38,39] the World Health Organization (WHO)-5 Wellbeing questionnaire[40,41] and the following questions about expectancy for labour and labour pain on an 11-point Likert scale:

- How do you expect you will experience the pain intensity during labour?
- To what extent do you expect the labour pain will influence your birth experience in a negative way?
- To what extent do you expect the labour pain will influence your birth experience in a positive way?
- How do you expect you will experience the childbirth in general? (Five-point Likert scale).

Six weeks postpartum, the women completed a second questionnaire that included information about their pain experience during labour and delivery. The participants only completed the specific questions about the pain experience if it was relevant. On 11-point Likert scales (scores: 0–10), they rated the level of perceived pain intensity at the end of the first stage of labour, during the second stage of labour, and just before receiving epidural analgesia, if relevant. They were also asked to what extent their labour pain influenced their birth experience positively and negatively, their perceived level of calmness, and whether they had experienced sufficient pain relief during birth.

Statistical power considerations

The statistical power calculations were based on existing data showing that approximately 34% of all nulliparous women delivering at Aarhus University Hospital Skejby received epidural analgesia. We hypothesised that the frequency of epidural analgesia would be 22% in the hypnosis group compared with 30% in the relaxation group (relative risk [RR] 0.73) and 32% in the usual care group (RR 0.68). To obtain a power of 80% (α 0.05; two-sided) for detecting a difference for these two comparisons, 446 participants had to be included in the hypnosis group, 446 participants in the relaxation group and 226 participants in the usual care group, in total 1097 participants. Because we expected that some participants would develop medical conditions that required epidural analgesia during delivery, give birth before receiving their allocated intervention, or give birth by scheduled caesarean section, we increased the required sample size by 10% in all three groups to a total of 1208 participants.

Statistics

Baseline characteristics were presented as frequencies and compared across study groups using chi-square tests for binary data. Rank scores and continuous data were analysed using analysis of variance (ANOVA) when data were normally distributed, otherwise by a nonparametric Kruskal–Wallis one-way ANOVA. Following the CONSORT statement, the data were primarily analysed according to the intention-to-treat principle. The primary outcome, use of epidural analgesia, was presented as frequencies and compared across study groups using a chi-square test for binary data. We also estimated a relative risk with the usual care group as reference. The secondary outcomes, self-reported pain, were presented as medians and compared using a nonparametric Kruskal–Wallis one-way ANOVA. The same methods were used in the per-protocol and pre-specified subgroup analyses.

In additional analyses, we adjusted for all baseline characteristics with logistic regression (epidural analgesia) or quartile regression (self-reported pain).

The statistical analyses were performed using STATA/SE version 11.2 statistical software (Stata Corp. LP, College Station, TX, USA).

Results

We invited 3554 women to participate, of whom 2443 did not respond. A total of 1217 women were included in the analysis. Information was available for all participants with respect to baseline characteristics and the primary outcome: use of epidural analgesia. The overall response rate for the questionnaire 6 weeks postpartum was high (97.0% in the control group and 98.4% in the two intervention groups). The response rate was lower for the specific questions about the pain experience as some women undergoing scheduled and unscheduled caesarean section did not find it relevant to respond (hypnosis group $n = 25$, relaxation group $n = 43$ and usual care group $n = 19$). Hence, in the analysis of self-reported pain, we included 468 in the hypnosis group, 451 in the relaxation group and 211 in the usual care group.

The baseline characteristics of the participants in the three groups were similar, with the exception that women in the hypnosis group had a slightly lower educational level (Table 1).

Blinding

We received 699 (59.8%) forms from the midwives on their estimation of the women's allocated treatment. The accuracy of the midwives estimation was highest in the relaxation group (58.4%) and lowest in the hypnosis group (31.5%) (Table 2).

Intention-to-treat analysis

The use of epidural analgesia was 31.2% (95% CI 27.1–35.3) in the hypnosis group, 29.8% (95% CI 25.7–33.8) in the relaxation group and 30.0% (95% CI 24.0–36.0) in the usual care group, revealing no statistically significant differences between the three groups (Table 3). For pain intensity and for pain influence on birth experience, minor differences were observed across the three groups, but again, no differences reached statistical significance (Table 4).

The adjusted analyses generally yielded results that were similar to those found in the unadjusted analyses regarding epidural analgesia (Table 3) and self-reported pain. Receiving epidural analgesia during birth was, however, found to be associated with a number of potential confounders, including smoking (RR 1.51; 95% CI 1.07–2.12), previous treatment for a mental health disorder (RR 1.42; 95% CI 1.00–2.02), expecting labour pain to influence the birth experience in a negative direction (RR 1.09; 95% CI: 1.02–1.17), and body mass index (RR 1.06; 95% CI 1.03–1.11).

Table 1. Baseline characteristics according to interventions

	Hypnosis (*n* = 493)	Relaxation (*n* = 494)	Care as usual (*n* = 230)
Age (years), median (IQR*)	29.9 (4.7)	29.9 (4.2)	29.4 (4.6)
Prepregnant BMI (kg/m^2), median (IQR)	22.0 (3.3)	21.9 (3.5)	21.8 (3.8)
Smoking, *n* (%)			
Before pregnancy	51 (10.3)	43 (8.7)	25 (10.8)
During pregnancy	4 (0.8)	6 (1.2)	4 (1.7)
Higher education (years beyond high school), *n* (%)			
None	17 (3.5)	10 (2.0)	2 (0.9)
1–4 years	248 (50.3)	262 (53.0)	135 (58.7)
4 years and longer	228 (46.3)	222 (45.0)	93 (40.4)
Living with partner, *n* (%)	476 (96.6)	479 (97.0)	227 (98.7)
Previously treated for a mental health disorder, *n* (%)	70 (14.2)	75 (15.2)	26 (11.3)
Previously been introduced to mind training, *n* (%)	124 (25.2)	113 (22.9)	53 (23.0)
WHO-5 wellbeing index, (maximum score 100), median (IQR)	72 (16)	72 (20)	68 (20)
PSS-10 stress test, (maximum score 50), median (IQR)	14 (6)	15 (6)	15 (5)
Expectations of the upcoming birth median (IQR)			
Pain intensity (0–10*)	9 (1)	9 (1)	9 (1)
Positive affect of labour pain (0–10*)	4 (3)	3 (3)	4 (3)
Negative affect of labour pain (0–10*)	5 (3)	5 (4)	5 (4)
Over all birth experience (1–5**)	3 (1)	3 (1)	3 (1)

BMI, body mass index; IQR, interquartile range.
*Range 0–10 (0: not at all, to 10: to the extreme).
**Range 1–5 (1: very positive, to 5: very negative).

Table 2. Midwives' estimate of the woman's allocation

Women's allocation *n* (%)	Estimation by midwives	
	True allocated group, *n* (%)	Wrong group, *n* (%)
Hypnosis (*n* = 305) (100)	96 (31.5)	209 (68.5)
Relaxation (*n* = 274) (100)	160 (58.4)	114 (41.6)
Control (*n* = 120) (100)	46 (38.0)	74 (61.7)
All (*n* = 699)	302	397

Additional analyses

We found no statistically significant differences across the three groups when conducting the per-protocol analysis and the pre-specified subgroup analysis taking pre-eclampsia, high blood pressure in pregnancy, gestational age at birth, and hypnotic susceptibility into account. The frequency of scheduled caesarean section was lower in the hypnosis group than in the remaining two groups (hypnosis group 2.2%, relaxation group 5.7%, usual care group 4.4%) and higher for unscheduled caesarean section (hypnosis group 17.9%, relaxation group 12.1%, usual care group 11.7%). When taking the mode of delivery into account, no statistical significant differences were found across the three groups.

As approximately 59% of the women also participated in antenatal training given by private providers concurrently with the allocated treatment, we conducted a subgroup analysis comparing women who had attended further antenatal training with those who had not. No statistically significant between-group differences were found within each of these strata.

Table 3. Use of epidural analgesia according to interventions: intention-to-treat analysis

Intervention group	Cases/*n*	Absolute risk, % (95% CI)	Unadjusted RR (95% CI)	Adjusted RR (95% CI)
Hypnosis	154/493	31.2 (27.1–35.3)	1.1 (0.76–1.53)	1.05 (0.75–1.50)
Relaxation	147/494	29.8 (25.7–33.8)	0.99 (0.70–1.41)	0.99 (0.70–1.41)
Care as usual	69/230	30.0 (24.0–36.0)	Reference	Reference

Table 4. Self-reported pain according to interventions: intention-to-treat analysis

	Hypnosis	Relaxation	Care as usual	*P* value
Pain intensity during labour				
Women not receiving epidural analgesia	*n* = 306	*n* = 296	*n* = 138	
Pain intensity at the end of first stage of labour, median (IQR)*	8 (2)	8 (2)	8 (2)	0.10
Pain intensity during second stage of labour, median (IQR)*	8 (3)	8 (3)	8 (3)	0.07
Women receiving epidural analgesia	*n* = 108	*n* = 124	*n* = 58	
Pain intensity at the end of first stage of labour, median (IQR)*	6 (6)	7 (5.5)	8 (6)	0.15
Pain intensity during second stage of labour, median (IQR)*	7 (4)	8 (4.5)	7 (6)	0.55
Pain intensity just before epidural analgesia, median (IQR)*	*n* = 143	*n* = 142	*n* = 62	0.33
	9 (2)	9 (2)	9 (2)	
Pain experience				
All women	*n* = 468	*n* = 451	*n* = 211	
Pain influence on birth experience in a negative direction, median (IQR)*	2 (5)	2 (5)	2 (4)	0.17
Pain influence on birth experience in a positive direction, median (IQR)*	5 (5)	4 (5)	3 (5)	0.72
Feeling of inner calmness during labour, median (IQR)*	8 (3)	8 (3)	8 (4)	0.33
Received the needed amount of pain relief, median (IQR)*	9 (3)	9 (3)	9 (3)	0.27

IQR, interquartile range.
*Range 0–10, (0: not at all, to 10: to the extreme).

Discussion

We carried out a large randomised, controlled trial with high compliance to the prescribed antenatal training programme. Baseline and obstetric information was available for all participants and the response rate for the follow-up questionnaire 6 weeks postpartum was high (98%). Blinding of the midwives was relatively successful. The primary hypothesis: that women undergoing a short antenatal course in self-hypnosis to ease childbirth would use less epidural analgesia and report less pain or a more positive experience of pain during childbirth when compared with women trained in relaxation methods or women receiving usual care, was not supported. However, no adverse effects of the interventions were reported.

Our results are in disagreement with the results of the majority of previous studies, which have reported hypnosis to be more effective in relieving pain during childbirth than both standard medical care,[25,29–32] traditional antenatal training[24,26,28] and supportive counselling.[22,33] Three studies did not report an effect on hypnosis when compared with traditional antenatal training,[27] Lamaze[42] and supportive counselling,[23] respectively. However, four of the thirteen previous studies were observational,[29–32] and of the nine experimental studies,[22–28,33,42] only five used a randomised controlled design.[22–25,27] The general tendency appears to be that studies using a nonrandomised design obtained more positive results, which could be explained by a higher risk of bias and confounding in these studies.[26,28–33] If participants are self-selected to use hypnosis, differences between women receiving hypnosis and controls could be the result of preintervention characteristics of the participants, rather than an effect of the intervention. Of the five randomised trials, three studies reported a positive effect of hypnosis, while two failed to identify any positive effect.[23,27] However, apart from one study that randomised 500 women in two groups,[22] sample sizes were small (40–65 women) with limited statistical power to identify reliable associations.[23–25,27] Also, many studies were published several years ago in birth settings that may differ from contemporary birth care.[25,27,28,32] Hence, we see our methodologically sound study as an important contribution to this field.

We used a three-arm design and compared a short course in self-hypnosis with a short course in relaxation and awareness techniques as well as a usual care group. Although relaxation training has been shown to reduce pain in other studies,[43] we did not find any effect of the relaxation and awareness training on the use of epidural analgesia or the women's pain experience.

If self-hypnosis is indeed efficacious, our negative results could be the result of insufficient design of the intervention. As the available financial resources for childbirth preparation are limited, we prepared a brief course inspired by Cyna et al.,[30,44] which could be implemented at low cost. Other studies showing an effect of hypnosis tend to both have used more time-consuming interventions[22–24,26–29,31,32] and have started the intervention earlier in pregnancy.[22–24,26–29,31,32] It is possible that a more intensive intervention or a different timing could have yielded a different result.

The blinding of the staff to the allocated treatment may also be a limitation. The midwives had no or little knowledge about hypnosis but were more familiar with relaxation. When using relaxation and mindfulness, the pain management strategy is to associate with labour and stay

present. In contrast, a parturient woman using self-hypnosis will typically drift away during labour because the strategy to manage labour is to dissociate (see Supporting Information, Appendix S1). If the midwives were not aware of that, the hypnotic process may be disturbed and a potential effect of hypnosis thereby obstructed. Furthermore, in other acute settings, a combination of hypnosis and training the staff in supporting the woman with hypnosis has been shown to be more effective in reducing pain and pain medication than hypnosis alone.[45–47]

The generalisability of our study is restricted to the intervention we tested, the study population from which we sampled, our inclusion criteria, and the sample we succeeded in recruiting. Compared with all nulliparous women giving birth at Aarhus University Hospital Skejby in the study period, our participants had, as we had expected, more term births (95.6% versus 92.5%), more spontaneous births (68.0% versus 63.4%), and a slightly lower use of epidural analgesia (30.4% versus 34.6%).[48] In general, they were a sample of healthy and generally socioeconomically advantaged women, and the intervention may only have had a modest potential effect in this group. Mehl-Madrona[22] found a pronounced positive effect of hypnosis while working with a focus on anxiety and fear and it may be that self-hypnosis has a larger potential in certain groups of women in need of resources to accomplish childbirth. Furthermore, the majority of our participants (59%) had joined additional antenatal training offered by private providers. Although we did not find any differences between the three groups when taking this into account, our results reflect a mixture of the allocated treatment and antenatal training offered by private providers, which could mask an effect—in addition to creating a ceiling effect with no further improvement possible.

Conclusion

To clarify the efficacy of antenatal hypnosis training to ease childbirth, we conducted a randomised controlled trial of a brief course in self-hypnosis for nulliparous women that would be realistic to implement and perform at low cost in most antenatal care settings. Contrary to our hypotheses, the intervention did not reduce the use of epidural analgesia during childbirth compared with relaxation or usual care, and did not show any effects on self-reported pain. Before turning down self-hypnosis as a method for pain relief, further studies are warranted that focus on specific subgroups, reconsider the length and timing of the intervention, and train the staff in structured supportive behaviour.

Disclosure of interests

There are no declared competing interests from any of the authors.

Contribution to authorship

All authors participated in the conception and design of the trial. AW was responsible for developing the intervention in hypnosis relying on GR as a consultant. Furthermore AW functioned as project manager, coordinated the data collection and performed the data analysis under the supervision of EAN, RZ and NU. AW wrote the first draft. All authors edited the manuscript and agreed on the final version. AW is guarantor.

Details of ethics approval

This trial was approved on 15 December 2008 by the Scientific Ethics Committee for the Region of Central Jutland, no. M-200080200 in Denmark and by the Danish protection agency on 5 November 2008, no. 2088-41-2797. The trial was also reported to ClinicalTrials.gov, number NCT00914082.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Training programme. ■

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