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Randomised controlled trial of effect of hands and knees posturing on incidence of occiput posterior position at birth

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Abstract

Objective To evaluate the efficacy of hands and knees position and pelvic rocking exercises on the incidence of fetal occiput posterior position at birth.
Design Multicentre randomised controlled trial.
Setting Seven maternity units in New South Wales, Australia, encompassing teaching hospitals and district general hospitals.
Participants 2547 pregnant women at 37 weeks' gestation; 1292 randomised to the intervention group and 1255 to the control group.
Intervention Hands and knees position and pelvic rocking exercises from 37 weeks' gestation until the onset of labour.
Main outcome measure Incidence of fetal occiput posterior position at birth.
Results 1046 women in the intervention group and 1209 women in the control group remained in the study until they went into labour. No significant difference existed between the groups for the incidence of occiput posterior position at birth: 105 (8.1%) women in the intervention group and 98 (7.8%) in the control group had a baby in a posterior position at delivery (difference in risk 0.3%, 95% confidence interval −1.8 to 2.4). The incidence of fetal transverse arrest was 3.4% (44 women) in the intervention group and 3.0% (38 women) in the control group (difference in risk 0.4, −1 to 1.7). No differences occurred between intervention and control groups for induction of labour, use of epidural, duration of labour, mode of delivery, use of episiotomy, or Apgar score.
Conclusion Hands and knees exercise with pelvic rocking from 37 weeks' gestation to the onset of labour did not reduce the incidence of persistent occiput posterior position at birth.

Introduction

Occiput posterior position is the most common malposition of the fetus with a vertex presentation. Persistent fetal occiput posterior position at delivery has been reported in up to 6% of all deliveries.[1 2] It is associated with deflexion of the fetal head and an increased incidence of prolonged painful labour, operative delivery, postpartum haemorrhage, vaginal trauma, maternal infection, and neonatal morbidity.[3 4]

Puddicombe first introduced the maternal hands and knees exercise as a way of facilitating fetal rotation antenatally in 1958.[5] Subsequent authors have recommended the use of the hands and knees exercise as the optimal method of facilitating anterior fetal rotation.[6–8] Evidence for this intervention is weak, however. A systematic review stressed that the hands and knees exercise cannot be recommended as an intervention until substantive evidence of its effect is available.[9] The authors recommended that a randomised controlled trial should be conducted to guide clinical practice.

Despite limited evidence of a beneficial effect, the hands and knees exercise has been adopted in many maternity facilities in Australia. We sought to assess the efficacy of this intervention in decreasing the incidence of persistent fetal occiput posterior position at delivery.

Methods

This randomised controlled trial took place between 1999 and 2001 in seven hospitals in New South Wales, Australia, encompassing university and district hospitals. Women were eligible to participate in the study if they had a single fetus and were not booked for elective caesarean section. A midwife or research assistant approached eligible women at 36-37 weeks of gestation. All women who agreed to participate gave fully informed consent before randomisation. We calculated gestational age by using the best available data from the last menstrual period and early ultrasound scan. No ultrasonography was done specifically for the purposes of this study.

Sample size

We designed the study to have an 80% power to detect a clinically significant 50% reduction in fetal occiput posterior position at delivery from 5% to 2.5% by using a two sided method with α set at 0.05. The calculated sample size was 1968.

Participants were randomised into two groups at a remote trial centre, by a computer generated allocation sequence. Because of the nature of the intervention, participants were not blinded. Although midwives who

ELPS *This is the abridged version of an article that was posted on bmj.com on 26 January 2003: http://bmj.com/cgi/doi/10.1136/bmj.37942.594456.44*

documented fetal position at birth and entered it into the hospital's obstetrics database could become aware of group allocation, this would not affect the objective outcome. The research assistants collecting and entering data were blinded to group allocation.

Intervention

The intervention group used a hands and knees position with slow pelvic rocking exercises for 10 minutes twice daily, beginning in the 37th week of gestation and continuing until the time of labour. Women in the experimental group received formal instruction on how to do the exercises from a midwife or research assistant. They were also given an instruction pamphlet to take home. Women in the control group were asked to do a routine exercise of daily walking.

Both groups received a diary in which to record any daily exercises or activities such as walking or swimming. In addition, we asked the intervention group to document daily information on hands and knees exercises.

Outcome measures

We compared the two groups for the incidence of persistent fetal occiput posterior position at birth. We considered persistent occiput posterior position to be present when the fetus was delivered spontaneously in a posterior position or was rotated manually or instrumentally from occiput posterior to an occiput anterior position before delivery. We asked obstetricians to record the position of the fetal head at emergency caesarean section of those study participants who had this mode of delivery. We considered transverse arrest to be present when forceps or vacuum delivery was used to rotate the fetus from a transverse position before delivery or where caesarean section was done at or near full dilation for failure to progress with the baby in an occiput transverse position. The midwife or delivering doctor recorded the position at birth on a study sheet, which was later cross referenced with the medical record. We also collected data on some secondary outcomes, including induction of labour, use of epidural, mode of delivery, duration of labour, use of episiotomy, and Apgar score.

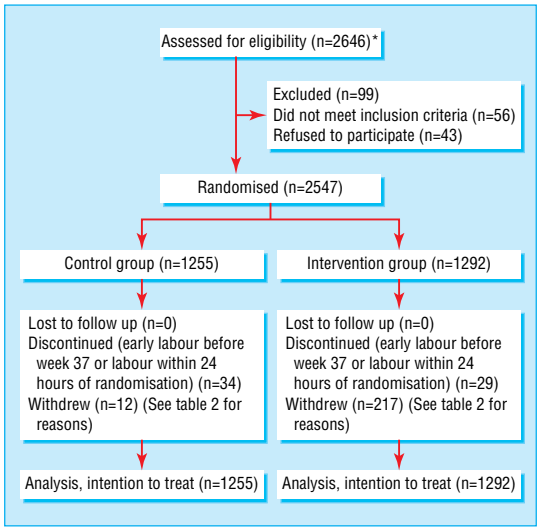
Statistical analysis

We compared incidence rates of persistent fetal occiput posterior position in the intervention and control groups by using the χ^2 test. We considered characteristics that were significantly associated with outcome variables ($P<0.05$) in the univariate analysis to be potential confounding factors and included them in a logistic regression model. We did the primary analysis by intention to treat.

Results

Over three years we randomised 2547 women, of whom 1292 were assigned to the intervention group and 1255 to the control group. The figure shows the flow of participants through the trial. During the study period 217 (17%) women withdrew from the intervention group and 12 (1%) from the control group.

No relevant baseline differences existed between the groups. The baseline characteristics of the women who withdrew were comparable to those of all participants. Women withdrew from the study groups for a variety of reasons, including a lack of time and finding the exercises uncomfortable or painful.



Flow of participants through the various stages of the trial. *Women were approached for recruitment if the clinic was not too busy

Primary outcome

A persistent fetal occiput posterior position was recorded in 105 (8.1%) women in the intervention group and 98 (7.8%) in the control group (table). This difference was not statistically significant (difference in risk 0.3%, 95% confidence interval −1.8% to 2.4%). The incidence of transverse arrest was also similar: 44 (3.4%) in the intervention group and 38 (3.0%) in the control group. Even after exclusion of women who withdrew from the study or had early labour, the incidence of persistent occiput posterior position was 7.8% (82/1046) in the intervention group and 7.9% (96/1209) in the control group. The incidence of transverse arrest was then 3.3% (35/1046) for the intervention group and 3.1% (38/1209) for the control group.

We also examined the effect of hands and knees exercise on the position of the fetus with adjustment for parity, as parity has been reported as a risk factor for occiput posterior position.[4] In a univariate analysis, we found that nulliparity was associated with an increased risk of occiput posterior position at birth (odds ratio 2.5, 95% confidence interval 1.9 to 3.3). Even after adjustment for parity, hands and knees exercise showed no effect on the position of the baby (odds ratio 0.94, 0.73 to 1.21). We found no significant interaction between parity and exercise.

Secondary outcomes

We found no differences between the intervention and control groups in induction of labour, use of epidural, duration of labour, mode of delivery, use of episiotomy, or Apgar score (table).

Adherence

Of 1046 women in the intervention group who remained in the study until the onset of labour, 371 (36%) did the exercise between 15 and 28 times, 364 (35%) did it 29-42 times, and 122 (12%) did it 43 times or more.

Of the 217 women who withdrew from the study, most (139; 64%) did the exercise between 1 and 14 times before withdrawal. Twelve (6%) women did the

Primary and secondary outcomes (intention to treat analysis). Values are numbers (percentages) unless stated otherwise

	Intervention group (n=1292)	Control group (n=1255)	% Difference in risk (95% CI)
Position of baby at birth			
Occiput anterior	1122 (86.8)	1091 (86.9)	−0.1 (−2.7 to 2.5)
Occiput posterior	105 (8.1)	98 (7.8)	0.3 (−1.8 to 2.4)
Transverse arrest	44 (3.4)	38 (3.0)	0.4 (−1.0 to 1.7)
Others (transverse lie, to breech, to face)	21 (1.6)	28 (2.2)	−0.6 (−1.7 to 0.5)
Labour			
No labour	33 (2.6)	29 (2.3)	0.3 (−1.0 to 1.5)
Induced	307 (23.9)	263 (21.0)	2.9 (−0.3 to 6.2)
Spontaneous	944 (73.5)	962 (76.7)	−3.2 (−6.6 to 0.2)
Missing	8 (0.6)	1 (0.08)	
Epidural			
Yes	372 (28.8)	357 (28.4)	0.3 (−3.2 to 3.9)
No	920 (71.2)	898 (71.6)	−0.3 (−3.9 to 3.2)
Mode of delivery			
Spontaneous	949 (73.5)	930 (74.1)	−0.7 (−4.1 to 2.8)
Emergency caesarean	139 (10.8)	142 (11.3)	−0.6 (−3.1 to 1.9)
Elective caesarean	26 (2.0)	22 (1.8)	0.3 (−0.8 to 1.3)
Forceps	71 (5.5)	52 (4.1)	1.4 (−0.3 to 3.0)
Ventouse	107 (8.3)	109 (8.7)	−0.4 (−2.6 to 1.8)
Episiotomy			
Yes	181 (16.0)	174 (15.9)	0.1 (−2.9 to 3.2)
No	947 (84.0)	919 (84.1)	−0.1 (−3.2 to 3.0)
Missing	164 (12.7)	162 (12.9)	
Mean (SD) duration of labour (min)	422 (282.3)	419 (267.9)	3 (−20 to 26)
Missing	143 (11.1)	147 (11.7)	
Apgar 1 (median)	9.0	9.0	
Apgar 5 (median)	9.0	9.0	
Missing	6 (0.5)	7 (0.6)	

exercise 15-28 times, and only 2 (1%) women did the exercise between 29 and 42 times. In addition to these 217 women, 29 women had a spontaneous onset of labour before 37 weeks or within 24 hours of randomisation without starting hands and knees exercise.

When we examined the exercise log of the women in the control group who remained in the study, a small proportion (8; 0.7%) had also done hands and knees exercises more than 15 times. A further 18 (2%) women had done the exercise 1-14 times before going into labour.

We reanalysed the data taking into account the number of times the women did the hands and knees exercise. Again, we found no effect of the level of exercise on the incidence of occiput posterior position at birth.

What is already known on this topic

Hands and knees exercise has been reported and widely adopted in practice as an intervention to rotate a posterior baby to the anterior position

A Cochrane review found insufficient evidence to support the effectiveness of this intervention

What this study adds

Hands and knees exercise during the last four weeks of pregnancy is not an effective intervention to reduce the incidence of persistent occiput posterior position at birth

Discussion

Pregnant women are often advised by their midwives to use exercise to facilitate the anterior rotation of the fetus. However, this advice is mainly based on personal belief. Research evidence to support this practice is limited. In a systematic review of this intervention published in 2002, only a single study was of sufficient quality to be included.[9] The authors of this review concluded that insufficient evidence existed to support the use of this intervention and recommended that a randomised controlled trial should be done to guide clinical practice. However, hands and knees posturing with pelvic rocking remains a widely used intervention in midwifery practice. Indeed, several of the hospitals that we approached to participate in this study refused because they thought that it would be unethical to deny women access to this intervention.

In our multicentre randomised controlled trial hands and knees position with slow pelvic rocking during the last few weeks of pregnancy did not reduce the number of babies with persistent occiput posterior position at birth. The confidence intervals show that at most the exercise might decrease the incidence of occiput posterior position by up to 1.8% or increase it by up to 2.4%. We found no difference between the intervention and control groups for induction of labour, use of epidural, duration of labour, mode of delivery, episiotomy rates, or Apgar scores.

Because most of the withdrawals occurred in the intervention group, this could have left the study slightly underpowered to detect a significant reduction in occiput posterior position. This was not the case, however, because the observed rate in the study population was more than 8% and power calculations were based on an expected rate of 5%.

Gardberg et al found that 68% of fetuses presenting as occiput posterior position at birth resulted from a malrotation from an initial occiput anterior position.[1] Fetal position in this study was identified through ultrasonography at the onset of labour. Persistent occiput posterior position was more common if the fetus was occiput posterior at the onset of labour, but this group accounted for only 32% of all occiput posterior babies at delivery. If these results are correct then hands and knees posturing for fetal rotation would not be beneficial before the start of labour in two thirds of women. We did not investigate whether or not posterior babies in our study developed through an intrapartum malrotation or through absence of rotation from a pre-existing occiput posterior position.

Identification of interventions currently used in practice that do not have a beneficial effect on outcome is important. Women who are advised to do these exercises to help to rotate the baby may feel a sense of failure or shame if they do not follow that advice. They may also find their confidence in their caregiver diminished if they follow the advice but the expected outcome does not occur. Moreover, hands and knees exercise in late pregnancy can be quite uncomfortable; this was one reason for withdrawal from the study group. In the absence of any proved benefit, these potential adverse effects become more important.

Hands and knees posturing with pelvic rocking exercise for achieving spontaneous rotation from occiput posterior to occiput anterior position is a com-

mon midwifery practice. This multicentre randomised controlled trial did not support the effectiveness of this intervention. Given the study design involving seven different units, these results would probably be applicable to other populations. Therefore, in the absence of evidence of a beneficial effect, we would suggest that this advice should be discontinued, at least as a way of changing the fetal position.

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Clinicians' roles in management of arsenicosis in Bangladesh: interview study

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The British Geological Survey in 2001 estimated that 46% of all shallow tube wells in Bangladesh contained arsenic at concentrations exceeding the World Health Organization's guideline concentration of 0.01 mg/litre. An estimated 28-35 million people were thought to be exposed to arsenic in their drinking water at concentrations exceeding even Bangladesh's arsenic standard of 0.05 mg/litre.[1] Many thousands of cases of chronic arsenic poisoning have now been identified, but the real magnitude of the health impact is still undefined.

In the 10 years since the problem of arsenic contamination of tube wells, on which a large proportion of the population depend for their drinking water, was identified the development of a coherent national strategy to manage this problem has been disappointingly slow.[2] Doctors have a vital role both in the diagnosis and management of arsenicosis and in the mitigation of this major public health threat[3] through educating their patients about options open to them to avoid the health effects of chronic poisoning. We explored the current and the desirable participation by doctors in the national arsenic mitigation effort.

Methods and results

In early 2002 one of us (RM) interviewed 20 doctors working in three hospitals in Dhaka that are well known for their interest and involvement in the arsenic problem and 22 doctors of comparable seniority from two other large hospitals in the city. The selection of the sample was purposive in that, with the help of administrative staff of the three "arsenic" hospitals, we identified a group of clinicians in departments of medicine, surgery, and dermatology, who were known to be actively involved in care of patients affected by arsenic. From the two other hospitals we identified from staff lists a randomly selected group of clinicians, of comparable seniority to those in the first group, who worked in a range of clinical specialties.

Interviews were also conducted with 17 senior managers from government, non-governmental, and international agencies that participate in the national arsenic mitigation programme in Bangladesh. Candidate agencies were identified for us by responsible government ministries, and respondents to the interview were identified by the chief administrator of each agency.

The table shows responses to key items in the interviews, including separate tabulation of the responses from the two groups of clinicians. Hospital doctors working outside the specialist arsenic units reported an inadequate understanding of the diagnosis and pathophysiology of arsenic poisoning, have not received training in this field, and are not involved in the national arsenic mitigation process. They are also apparently not diagnosing arsenic poisoning, whether or not the affected patients are presenting to them with the multisystem complications that chronic exposure to arsenic produces. Their hospitals provide services to patients from areas that are known to be contaminated.

Several representatives of the arsenic mitigation agencies confirmed that progress in development of an effective national mitigation programme is slow and that an understanding of the public health nature of the problem is widely lacking. They also expressed the view that doctors could have several important roles in dealing with the problem.

Comment

Doctors working in two Dhaka hospitals that receive patients from contaminated areas were inadequately informed to recognise and manage arsenicosis.

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