

Hydrotherapy and the Swiss ball in labor: randomized clinical trial

Hidroterapia e bola suíça no trabalho de parto: ensaio clínico randomizado

Angelita José Henrique¹

Maria Cristina Gabrielloni¹

Ana Carolina Varandas Cavalcanti¹

Patrícia de Souza Melo¹

Márcia Barbieri¹

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Corresponding author

Angelita José Henrique
Napoleão de Barros street, 754,
04024-002, Vila Clementino.
São Paulo, Brazil.
angel.j.henrique@gmail.com

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Abstract

Objective: To understand the influence of a warm bath and perineal exercise with the Swiss ball, in an isolated and combined manner, on the progression of labor.

Methods: Randomized and controlled clinical trial, conducted from 2013 to 2014 in two public hospitals, with 128 women hospitalized for labor and delivery. The randomization allocated 44 parturients into the warm bath group, 45 into the Swiss ball group, and 39 into the warm bath with Swiss ball group.

Results: The study showed a statistically significant increase in the frequency of uterine contractions with the isolated technique ($p = 0.025$) and associated Swiss ball use ($p < 0.001$), and a significant increase in fetal heart rate with isolated and associated warm bath use ($p < 0.001$).

Conclusion: The association of the warm bath and Swiss ball was more effective for the progression of labor and vaginal delivery outcome when compared to the isolated use.

Resumo

Objetivo: Conhecer a influência do banho quente e exercício perineal com bola suíça, de forma isolada e combinada, sobre a progressão do trabalho de parto.

Métodos: Ensaio clínico randomizado e controlado, realizado em dois hospitais públicos, no período de 2013 a 2014 com 128 mulheres internadas para assistência ao parto. A randomização aleatória alocou 44 parturientes no Grupo Banho Quente, 45 no Grupo Bola Suíça e 39 no Grupo Banho Quente e Bola Suíça associados.

Resultados: A pesquisa mostrou aumento estatisticamente significante na frequência da contração uterina com uso isolado ($p=0,025$) e associado da bola suíça ($p<0,001$), um aumento também significante na frequência cardíaca fetal com uso isolado e associado do banho quente ($p< 0,001$).

Conclusão: Associação do banho quente e bola suíça foi mais efetiva para a progressão do trabalho de parto e desfecho para o parto normal quando comparado com o seu uso isolado.

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¹Escola Paulista de Enfermagem, Universidade Federal de São Paulo, São Paulo, SP, Brazil.

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Introduction

Measures to increase comfort and reduce apprehension during all stages of labor should begin during gestation, by means of education and counseling during prenatal care, so that women are able to make choices.⁽¹⁾

Non-pharmacological interventions are considered auxiliary tools in care during labor, support for pain reduction, stress and cesarean rate, and reflect on the quality of obstetrical care provided.⁽²⁻⁴⁾

The warm bath, or hydrotherapy, is a non-pharmacological method that uses water heated to 37°C as a therapeutic object, offering different benefits during labor, such as greater pain tolerance, stress reduction, regulation of uterine contraction pattern, and satisfaction with the labor process, by offering greater autonomy to the woman with regard to her choices, and the possibility for active participation by her companion.^(2,5-7)

The effect of local heat during the bath stimulates redistribution of muscular blood flow, increasing relaxation and comfort.^(2,5,8) The cost-effectiveness is good, since it is an easy to access, low cost technique.⁽⁶⁾

Perineal exercise with the Swiss ball facilitates the adoption of a vertical posture of the parturient in a comfortable sitting position, promoting well-being and pelvic mobility.⁽⁹⁾ It provides relief from pelvic discomfort, and reduces the time to delivery. This is effective in reducing the need for analgesic medication, epidural anesthesia, and cesarean section.^(9,10)

The combined use of warm bath therapies associated with perineal exercises using the Swiss ball, during the dilation phase, is related to the relevant reduction of the laboring woman's pain, and the promotion of comfort in relation to the isolated use of these therapies.⁽²⁾

Evidence-based clinical practices that favor and stimulate vaginal delivery are recommended and should be encouraged.⁽¹¹⁾

The importance of this research is justified as cooperation in the evidence that supports the prac-

tice of obstetrical nurses and other professionals involved in the care of laboring women, contributing to a change in posture, in a contemporary context, in delivery care and modification of obstetrical care in Brazil.

The objective of the present study was to understand the influence of the use of the non-pharmacological interventions of a warm bath and/or perineal exercises with the Swiss ball, on the labor process.

Methods

This was a randomized controlled trial with three study groups using repeated pre and posttest measures: warm bath group (AG), perineal exercises with the Swiss ball group (BG), and combined interventions group (CG). The data collection period was from June of 2013 to February of 2014, in two public hospitals in the city of São Paulo, Brazil, which routinely use pain relief methods in obstetric care, in addition to allowing the presence of the companion.

Participants

The inclusion criteria were: minimum age of 18 years, single and living fetus, cephalic presentation, no clinical or obstetrical pathology, cervical dilatation between 3 and 8 cm, term gestational age. The exclusion criteria were indication for cesarean delivery, analgesia, patients with mental disorders, drug users, and those who completed less than six prenatal visits.

The sample was calculated from a pilot study, using the G* power program, ANOVA test, significance level of 0.05 and test power of 0.80. The sample consisted of 43 parturients in each group.

Ethical and legal aspects

This research met the principles of the Declaration of Helsinki, and was approved by the hospitals involved, the Research Ethics Committee of the Federal Universidade Federal of São Paulo No 1200/11, and was registered in the Brazilian Clinical Trials Registry (ReBEC) RBR-84 XPRT.

Data collection

A team of obstetrical nurses was trained for data collection, guiding the eligible parturients about the purpose and procedures of this study, obtaining consent and sample randomization.

The parturients were evaluated before the intervention on the frequency of uterine contractions, fetal heart rate, cervical dilatation, fetal descent stations according De Lee planes. The socio-demographic and obstetrical data were obtained from the medical record and in the interview with the parturients.

The warm bath as a therapeutic intervention was performed using a warm water jet spray directed to the lumbo-sacral region, at the temperature of 37 degrees Celsius (°C) measured with the Akso® digital thermometer. The parturients were instructed to adopt the standing or sitting position for the 30 minute duration of the bath.^(2,5,6)

The perineal exercise as a therapeutic intervention was performed using the Swiss ball. The parturients were instructed to sit on the ball with their legs flexed, at a 90° angle, knees apart, with the plantar region of the feet resting on the floor, performing movements of propulsion and pelvic rotation for 30 minutes.^(2,9)

The ball used was the Gynboll®, 60cm diameter. For safety, the ball was inflated and positioned on a firm, non-slip surface, without any perforating object on the floor. After each use, the cleaning and protection of the ball were performed by washing with soap and water, disinfecting with 70% alcohol, and wrapping with plastic film.

The combined intervention of a warm bath while sitting on the Swiss ball, for 30 minutes, was performed according to techniques and precautions related to the interventions described above.

The parameters previously described were re-evaluated 30 minutes after the interventions. The time elapsed between the intervention and the birth and the type of delivery were also recorded.

Statistical analysis

Mean and standard deviation were used for continuous variables, and for those of a categorical nature, proportions were used. Univariate analysis was used to evaluate effectiveness between interventions and Bonferroni correction for multiple comparisons. In order to treat, imputations were performed by means of sequential regression. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS), version 21, with a significance level of 0.05.

Results

During the recruitment procedures, 137 parturients were eligible, but nine were excluded before randomization. Thus, 128 parturients were randomly allocated into the three intervention groups, divided into GA: warm bath (n=44), GB: Swiss ball (n=45) and GC: combination of warm bath and Swiss ball (n=39) (Figure 1).

Table 1 presents the sociodemographic and obstetric characteristics of the 128 study participants. Homogeneity was found between groups.

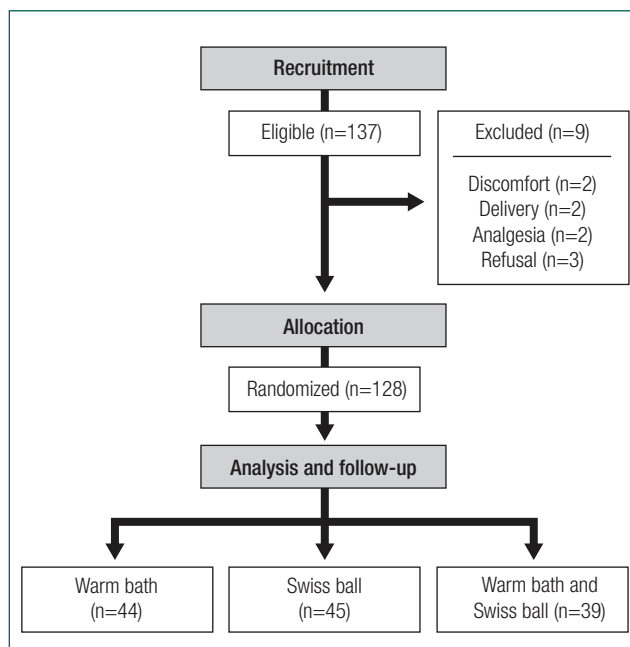


Figure 1. Flowchart of the study participants

No analgesia was used during any of the interventions, 24 received anesthesia after participating in the study (AG=15.9%, BG=24.4%, CG=15.4%), 108 had a vaginal delivery (AG=86.4%, BG=80.0%, CG=87.2%), 20 had a cesarean delivery (AG=13.6%, BG=20.0%, CG=12.8%). Fetal wellbeing was monitored by cardiotocography (AG=9.1%, BG=4.7%, CG=10.3%); all newborns received an Apgar >7 at five minutes of life, and the companions of 115 parturients were present during labor (AG=88.6%, BG=88.9%, CG=92.3%). The mothers had an average of eight prenatal visits; approximately 90% did not attend childbirth classes.

Post-intervention results were compared with the pre-intervention results, and the behavior of the outcomes was different between the study groups.

The effectiveness among interventions for the occurrence of the outcomes is shown in table 2.

The cervical dilatation was similar between the groups when introduced in the study, with 5 cm of dilation, increasing in all groups after receiving the interventions. However, the group that received the combination of a warm bath and Swiss ball (CG) was more effective in increasing cervical dilatation, without a statistically significant difference, in relation to the groups

that received isolated interventions (6.69 cm/ p=0.194).

Progression of the fetal head presentation was verified to be in the birth canal for all groups after interventions. The combined warm bath and Swiss ball group (p=0.688) showed a higher progression of the presentation, and was more effective for this outcome than when performed alone, warm bath (AG) (p=0.428) and swiss ball (BG) (p=0.679).

The frequency of uterine contractions increased in all three intervention groups. The groups that used the combination of a warm bath and Swiss ball (CG) (p<0.001), and the Swiss ball alone (BG) (p=0.025) showed a statistically significant difference in relation to the warm bath (AG) group.

The basal fetal heart rate (baseline FHR) remained within normal limits before and after interventions. The warm bath (AG) (p <0.001) and the combination of a warm bath and Swiss ball (CG) (p <0.001) interventions were effective in increasing the fetal heart rate. These groups presented a statistically significant difference in relation to the group swiss ball (GB).

The time between interventions and childbirth was shorter in the group warm bath and swiss ball

Table 1. Distribution of parturients according to sociodemographic and obstetric characteristics

Characteristics	(AG) Warm bath	(BG) Swiss ball	(CG) Combination of warm bath and Swiss ball	n	p-value
Age (mean/sd)	26.04(5.4)	27.24(6.47)	24.56(4.9)	128	0.101*
White	56.80	44.40	44.70	127	0.158†
Education 8-11 years	61.40	75.60	73.70	127	0.639†
Marital status: single	50.00	64.40	47.40	127	0.367†
No occupation	56.80	53.30	42.10	127	0.345‡
Gestational age (mean/sd)	39.6(1.01)	39.6(1.16)	39.6(1)	128	0.731*
Number of pregnancies (mean/sd)	1.95(1.36)	2.24(1.33)	1.79(0.97)	128	0.246*
Parity (mean/sd)	0.75(1.16)	0.71(0.91)	0.56(0.75)	128	0.511*
Number of miscarriages (mean/sd)	0.2(0.46)	0.4(0.88)	0.23(0.48)	128	0.313†

*ANOVA test, †Fisher's exact test, ‡Chi-square test

Table 2. Distribution of interventions according to effectiveness for outcomes

Outcome	AG - CG mean/sd	p-value	BG - CG mean/sd	p-value	AG - BG mean/sd	p-value
Cervical dilatation (cm)	-0.0158(0.27)	0.954	-0.3623(0.273)	0.188	0.3464(0.26)	0.194
Level of fetal head presentation (DeLee)	-0.079(0.1968)	0.688	-0.1577(0.19)	0.428	0.078(0.18)	0.679
Frequency of contractions(number/min)	-0.301(0.074)	<0.001	-0.115(0.07)	0.315	-0.1860(0.07)	0.025
Basal fetal heart rates (bpm/min)	0.9678(0.72)	0.546	-2.75(0.71)	<0.001	3.72(0.69)	<0.001
Time between intervention and childbirth (min)	41.18(34.57)	0.236	74.16(34.39)	0.09	-32.97(33.32)	0.324

associated (CG), lasting 216.85 minutes. The use of the combined interventions was more effective in reducing labor time by 41.18 minutes in relation to the warm bath group (CG), which lasted 255.05 minutes ($p = 0.236$), and by 74.16 minutes in relation to the Swiss ball group (BG) that lasted 288.41 minutes ($p = 0.09$), but did not show significant difference.

Discussion

This research, when evaluating the influence of the non-pharmacological interventions of a warm bath and perineal exercises with Swiss Ball on the progression of labor, showed that the group of combined interventions (CG - warm bath and Swiss ball combined) was clinically favorable to labor progress and vaginal delivery, in relation to the isolated interventions.

Women who received the combination of a warm bath and Swiss ball (CG) needed less analgesia, had a greater occurrence of vaginal delivery (87.2%), a more rapid progression of cervical dilatation, a better evolution of fetal head presentation, increased frequency of contractions ($p < 0.001$) and fetal heart rate ($p < 0.001$), a greater reduction in labor time of 41.18 minutes, compared to the warm bath group (AG), and 74.16 minutes compared to the Swiss ball group (BG).

These non-pharmacological interventions are used as an auxiliary therapy during labor, and are well known throughout the world. Most studies describe their use alone, and compare effectiveness with other interventions, mainly addressing pain management in labor.^(2,5,6,9)

They are part of the international policy strategies for caring the women during pregnancy, labor and childbirth.^(10,12,13) Their use must be respected and encouraged by professionals who provide care for childbirth, if chosen by the parturient.⁽¹¹⁾ These interventions can be used alone or in combination, promoting continuous support, maternal well-being, and favoring the evolution of labor.^(2,6,9,14)

Studies show that using a warm bath during labor is a growing maternal choice intervention. It is

related, in a significant way, to a reduction in the need for epidural analgesia, when compared with parturients who did not use it. The early use of the warm bath (when dilatation is less than five cm) is related to increased use of analgesia when compared to women who use the intervention when dilatation greater than five cm.⁽⁷⁾

The warm bath provides relief from pain and anxiety, increases the comfort, and provides positive feelings during the labor,^(5,6) especially when combined with perineal exercise with the Swiss ball.⁽²⁾ Its use facilitates a professional approach when patient-centered care is provided, which results in benefits for labor progress.⁽⁷⁾

The use of the Swiss ball to perform perineal exercises during labor is an auxiliary therapy in the obstetrical practice that promotes comfort and pain relief, labor progression, and favors the vertical position.⁽¹⁵⁾ This intervention provides less need for medication and cesarean section.^(2,9,10) However, to date, few clinical trials have been conducted on this topic to support the effects on the labor progress and childbirth, and most of the studies are focused on pain relief.

The understanding of the benefits related to the use of the Swiss ball lies in the fact that the vertical position favors the gravitational force and the alignment of the fetal axis with the maternal pelvis, the descent and fetal progression in the birth canal, aided by relaxation caused by perineal muscle exercise. The effects of pelvic position and movement during labor may be related to the reduction of maternal discomfort,⁽²⁾ facilitate uterine circulation, increase the intensity of the contractions, which can decrease the length of labor, facilitate fetal progression in the birth canal, as well as reduce the possibility of perineal trauma and the need for episiotomy.^(9,10,16)

Women who used this therapy presented a reduction in pain, an increase in the active participation in the labor process, decreased use of epidural anesthesia, shorter duration of the first stage of labor, and a lower cesarean section rate than the control group.⁽⁹⁾

A detailed description on the records about the use of the Swiss ball during pregnancy and labor can provide an auxiliary tool for the standardization of its use by professionals in relation to the promotion of women's comfort and care during the labor progress.^(9,16)

The Safe Motherhood Program, adopted by the Ministry of Health, makes reference to the practices used in the management of labor that promote maternal well-being, with reference to methods of pain relief and promotion of comfort as “practices that prove to be useful and should be encouraged”. Therefore, having an outcome of a vaginal delivery helps this process and provides support for the patient.⁽¹⁷⁾

Surveys on the rate of surgical delivery in Latin America show that about 850,000 caesareans are unnecessarily performed every year. Brazil is among the countries with high cesarean rates: close to 50%. The increasing proportion of cesarean rates in Brazil has risen from 52.3% in 2010 to 55.6% in 2012, and according to the Ministry of Health, this rate reaches 82% in the private network and 37.5% in the Public Health system.⁽¹⁸⁾

Therefore, encouragement of normal birth is related to support in the reduction of unnecessary cesarean rates. Formulation of public policies, women’s autonomy, and changes in the care practices during the prenatal and labor periods may contribute to the reduction of unnecessary caesarean sections.⁽¹⁹⁾

The applicability of the findings of this study give support, by means of evidence, to the use of non-pharmacological interventions empirically used by obstetricians and other professionals who provide care to the parturients, offering comfort, freedom and autonomy to these women, and stimulating vaginal delivery in Brazil.

Conclusion

Our study showed that the use of a warm bath, and perineal exercises with the Swiss ball modify the labor progress. The combination of these interventions demonstrated greater clinical relevance to the labor process. We recommend combining the warm bath with the perineal exercise using the Swiss ball during the labor process, as it showed to be more effective for changes in the labor progress, shorter length of labor, and higher occurrence of vaginal delivery than with the isolated use of these interventions.

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Collaborations

Henrique AJ, Gabrielloni MC, Cavalcanti ACV, Melo PS and Barbieri M declare that they contributed to the study design, analysis and data interpretation, article writing, relevant critical review of the intellectual content, and final approval of the version to be published.

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