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Effectiveness of therapeutic showering in pain relief during the first stage of labor

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Abstract

Introduction
Pain prevention and effective control is emphasized as a priority for the obstetric unit's humanization. The therapeutic shower it's an easy-to-deploy non-pharmacological alternative whose effectiveness has not been recognized by nurses.

Objective
The aim of this study was to evaluate the effectiveness of therapeutic showering for pain relief during the first stage of labor.

Methods
Quasi-experimental study with the following research question: Is the therapeutic shower effective in relieving pain during the first stage of labor? Convenience sampling (n=81) was used. Data were collected in the two maternity wards. Labor pain was assessed using a Numeric Scale before water application as a comparative standard of pain level before and after warm water application (immediately after, 10 and 20 minutes after). Data analysis was performed using SPSS®, v.27.

Results
Repeated measurement ANOVA showed statistically significant results. Contrast analysis between the first and second measurements revealed significant differences between the mean level of pain immediately and 10 minutes after water application. However, post hoc analysis revealed that after 20 minutes, the differences between the means were not statistically significant.

Conclusion
Therapeutic showering is effective in pain reduction immediately and 10 minutes after application.

Keywords
Hydrotherapy; Labor Pain; Pain Management; Pain Measurement.

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Introduction

Pain can significantly influence the development of labor and interfere with the decisions and satisfaction of women. Anxiety and pain can be associated with longer labor, higher levels of stress hormones, and greater use of pharmacological analgesia.[1-5] As privileged caregivers of parturients, fetuses, and families, obstetric nurses can play an essential role when considering pain as the fifth vital sign and promoting the use of non-pharmacological strategies for its relief.[6]

Providing non-pharmacological alternatives that facilitate women's autonomy and decision-making in pain management during labor can minimize fear and anxiety and facilitate the release of hormones that favor the birthing process.[7] In the first stage of labor, several studies have reported that conventional pharmacological approaches may not be beneficial for the physiological evolution of labor.[8] Obstetric nurses can use their skills and contribute objectively to prevent the unwanted effects of pharmacological strategies, improve physical sensations, and mitigate the psychological and emotional perception of pain in parturients.[9]

Among existing non-pharmacological labor pain relief alternatives, hydrotherapy (defined as the external application of water for therapeutic purposes) has been considered by several national and international institutions as an option that can provide significant pain relief and optimize the positive delivery experience of women, fetuses and families.[6, 9-12]

In Portugal, the Board of the Obstetric and Maternal Health Nursing Specialty College of the Council of Nursing[9] has a project called Maternity with Quality in which, one of the indicators of the relevance of the project and measurement, highlights the importance of promote and apply non-pharmacological pain relief measures in labor and delivery. The project maintains that the use of water during labor for pain relief, in the first and second stages, promotes the well-being of women and contributes to lowering the incidence of episiotomies and cesarean deliveries. Two of the core concepts of maternal health and obstetric nursing care are woman-centered care and the promotion of normal childbirth.[13] In this context, making therapeutic showers available to women and supporting them in decisions regarding labor pain management can contribute to the recognition of the role of women in childbirth and its depathologization.[14]

The Portuguese Council of Nursing[15] states that the therapeutic use of warm showers results in a statistically significant reduction in the use of epidural analgesia during the dilation period and does not present adverse effects with implications for the duration of labor, the rate of surgical births, and neonatal well-being. Providing hydrotherapy in Portuguese hospitals, in this case in the form of showers with warm water, means providing women with an empowering environment and instituting adequate care policies that include non-pharmacological strategies for pain relief in obstetric units. In this context, and taking into account its beneficial effects, it is essential to encourage the use of therapeutic showers, given how easy they are to apply and that they do not require large investments in resources. Despite the contributions mentioned above, in practice, the use of showers is not widespread. Stark and Miller[16] described some of the barriers to this implementation. These authors consider it important to develop research on such barriers, including strategies to overcome them.

Stark[17] tested the effectiveness of therapeutic showering during labor in a study with 32 parturients in active labor, in which water was applied for 30 minutes. The study found that in relation to the control group, there was a statistically significant reduction in pain, and that therapeutic showering was effective in reducing pain, discomfort, anxiety, and tension, while improving relaxation and supporting labor.

Despite this evidence, in Portuguese maternity hospitals, the use of hydrotherapy is far from widespread and often neglected in relation to pharmacological strategies. If on the one hand, material resources (in the case of immersion baths or showering) are essential, on the other hand, producing research and disseminating results about the effectiveness of the strategy can help motivate nurses and develop evidence-based practices.

Stark[18] considered it important to distinguish therapeutic showering from hygienic showering, which usually includes active effort and movement to wash and cleanse. Therapeutic showering is mainly passive, allowing the flow of water to achieve the intended effect. Therapeutic reasons for showering may include heating, cooling, humidifying, relaxing, revitalizing, and massage, as well as pain relief.[19] To obtain the desired benefit of showering, exposure to a warm shower requires more time than what is needed for hygienic showering.

Although there have been some studies that evaluate the effectiveness of hydrotherapy, the available scientific evidence focuses on hydrotherapy performed with immersion baths. In some countries, warm showers during labor are commonly used, but have not been subjected to scientific study and are not discussed.[20] In this context, it is necessary to assess its effectiveness to establish evidence-based practice that promotes a healthier and more rewarding childbirth experience.

The aim of this study was to evaluate the effectiveness of therapeutic showering for pain relief during the first stage of labor in Portuguese hospitals.

Methods

The methodological options chosen based on the nature of the research problem and objectives are foundational to ensuring the reliability and quality of research results. This was a quasi-experimental study which investigated a specific population, in this case, women who reported pain in the first phase of labor, with the following research question: Is the therapeutic shower effective in relieving pain during the first stage of labor?

The evolution of pain levels was evaluated before applying water vs. three times after water application (immediately after, 10 minutes after, and 20 minutes after), in the pelvic area, in the lower back, or in more than one location. Data

analysis was performed using the repeated measures ANOVA. The assumptions were analyzed using the Kolmogorov-Smirnov and Mauchly's tests[21] which analyze the normality of distributions and the sphericity of the matrix of variances-covariances, respectively. The variable "pain level" presented normal distribution in the first two assessments after application, immediately after application and 10 minutes after application, with $p>0.05$. The variable "pain level", in the third application did not present normal distribution, homogeneous variances, or zero covariances ($W=0.974$; $X2(2)=1.933$; $p=0.380$), indicating sphericity. Multiple comparisons were made using contrasts with the first measurement (immediately after water application) as a reference and conducting the Fisher's LSD post-hoc test. The data were analyzed using IBM SPSS®, v. 27 (IBM Corp., Armonk, N. Y., USA).

Participants

Sampling was non-random, accidental, casual or convenient[21] and included 81 observations (n=81). Participants included all women in labor who met the inclusion criteria: parturients in the first stage of labor who verbalized pain; were 18 years old or older; had a low-risk pregnancy, were at full term pregnancy, and had a single fetus; and expressed an interest in participating. The study established clinical criteria that guaranteed the safety of the intervention and its evaluation. Ethical and legal requirements for studies with human subjects were followed, and participants signed free and informed consent forms. Women who were submitted to other pharmacological or non-pharmacological pain relief strategies were excluded.

The study was conducted in two Portuguese maternity wards (one in a public hospital and the other in a private hospital) in Lisbon, between June 2018 and December 2021. It is worth emphasizing that the data collection period was extended because of the restrictions imposed by the SARS-CoV-2 pandemic in Portugal.

Risks/Benefits for participants

The intervention (therapeutic showering) did not imply predictable risks for the parturients or fetuses. According to the American College of Nurse-Midwives[22], high-quality research validates the use of hydrotherapy for pain relief during labor, which does not increase risks for healthy women during childbirth or neonates when evidence-based clinical guidelines are followed. Obstetric nurses who were caring for the parturients were responsible for verifying their clinical conditions to ensure their safety. The use of this strategy involved reorganizing spaces and equipment to provide the necessary physical resources for access to and application of therapeutic showers, to preserve the privacy and intimacy of the participants, and to ensure safety during the procedure, especially by preventing sudden changes in water temperature and preventing falls. The benefits for participants in this study were related to pain relief as a result of the proposed intervention.

Data collection instrument

A two-part questionnaire was created for this study. The first part gathered sociodemographic and obstetric information about the participants and included the following items: age, level of education, nationality, obstetric index, location of prenatal care, preparation/negotiation of a birth plan, attendance at childbirth and parenthood preparation course, and whether therapeutic showering was included in this course. The second part included questions about the location of pain (pelvis, lower back or more than one location), duration and location of therapeutic shower application, and assessment of pain level at four times (before the intervention, immediately after, 10 minutes after, and 20 minutes after). An 11-point numerical scale was used to assess pain. This scale consists of a ruler divided into eleven equal parts, numbered sequentially from 0 (which corresponds to no pain) to 10 (which corresponds to maximum pain).[23] The horizontal version of the ruler was use. The pain intensity was always that reported by the participants, and it was recorded by the obstetric nurses at the different assessment times. All parturients received an explanation about the scale using simple and accessible language and confirmed that they had correctly understood its meaning and how to use it.

Ethical aspects

This study was approved by the Health Ethics Committees of the institutions involved (RNEC: 20170700050). Informed consent forms were signed by all the participants, who were told that they could withdraw their participation at any time without any consequences and without having to explain their reasons. The participants were also informed that the data collected would be confidential, coded and entered into a database for statistical analysis, and would only be used for the purpose of this study. Secrecy and anonymity were guaranteed, as well as privacy and intimacy during the intervention. All procedures were carried out in accordance with Declaration of Helsinki and relevant guidelines and regulations.

Intervention

Therapeutic showering was the intervention. All potential participants were informed about the intervention by the obstetric nurses and asked about their availability to participate in the study. In all situations, the evolution of labor was assessed, and auscultation of the fetal heart rate was performed before and after the intervention.

The participants were free to choose where to apply water, and the nurses recorded where the water touched their bodies. The duration of water application was recorded in time intervals: less than 10 minutes, between 10 and 20 minutes, and more than 20 minutes. Warm water was made available, and each parturient adjusted the temperature to best suit their well-being and comfort.

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Results

The parturients who participated in this study were between 18 and 45 years old, with a mean age of 30 years (M=29.96) and a standard deviation of 6 (SD=5.54). Regarding country of origin, 77% were Portuguese, 11% Brazilian, 5% Cape Verdean, 4% Angolan, and the remaining 3% were Australian, Italian, and Russian (1% each). In terms of level of education, 50% had a higher education degree (undergraduate degree 3%, graduate degree 47%), 35% had studied up to year 10 and 12 of secondary school, and the remaining participants, up to year 4 of elementary school.

Of the participants, 69% were primiparous (first-time parturients) and had not attended a childbirth preparation course. The remaining 31% had attended a preparation course, and 26% reported that the course had covered hydrotherapy.

Pain was assessed before the intervention, to establish a comparative level of pain before water application, and after application (immediately after application, 10 minutes after, and 20 minutes after) (Figure 1).

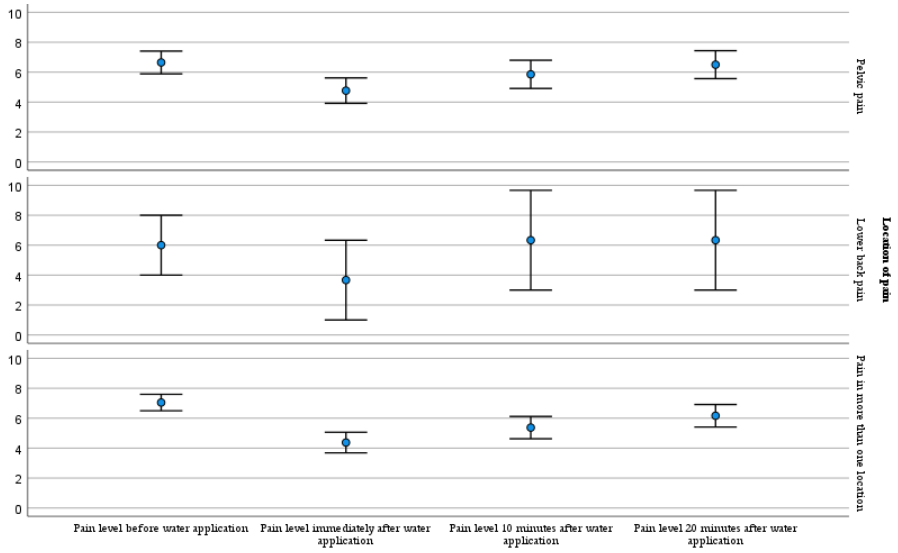

Figure 1 - Pain level distribution by location of pain [Mean+-2 Standard Error (SE)]

To analyze the mean pain levels at the different times after water application, the mean value of pain before its application was used as a baseline (Mean=6.85, SE=0.22). Figure 2 shows that the average pain level decreased immediately regardless of time after water application, with a progressive increase at 10 and 20 minutes. However, the water application time in minutes shows a greater dispersion of data when it is less than 10 minutes and more than 20 minutes, compared to the intermediate time between 10 and 20 minutes.

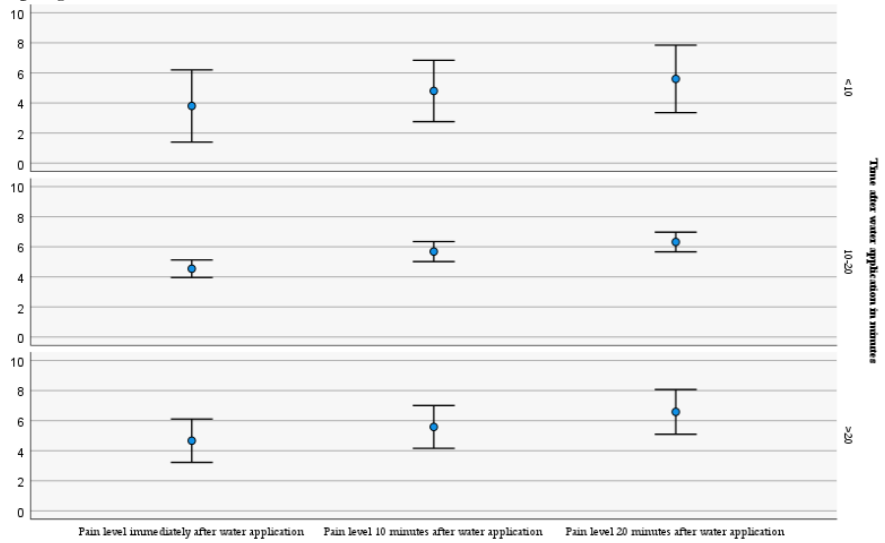

Figure 2 - Distribution of pain level according to time after water application

The data for the three pain assessment times were also analyzed in terms of location of water application (pelvis, lower back, or more than one place).

As shown in Figure 1, increased pain levels (pelvic, lower back, and in more than one location) occurred immediately after the application of water, and at 10 and 20 minutes post-intervention, although with greater data dispersion when the pain was in the lower back.

The repeated measures ANOVA showed that the results were statistically significant [$F(2.10)=23.12$; $p<0.001$; $\eta 2p=0.236$ and $\pi = 0.878$]. The contrast analysis between the first measurement (before the water application) and the other measurements showed no statistically significant differences, with the exception of contrast analysis between the first and second measurements that revealed significant differences between mean level of pain assessed immediately after water application and 10 minutes after application [$(F(1.5)=15.324$, $p<0.001$, $\eta 2p= 0.170$ and $\pi=0.972$]. However, the post-hoc analysis revealed that after 20 minutes, the differences between the means were not significant ($p>0.05$).

Discussion

In most studies of the therapeutic application of water, a large number of authors, are used as references or used in the discussion of their results, have only investigated the effect of hydrotherapy applied through immersion baths, such as in Benfield et al.[4], Simkin and Bolding[20], Eckert et al.[24], Cluett et al.[25], Silva et al.[26] and Gallo et al.[27] Of these, Eckert et al.[24] stands out because, unlike the others, it concluded that immersion in warm water does not confer any clear benefits to parturients and that when the water temperature is above 37 °C, it can be harmful to the fetus.

When considering hydrotherapy for pain relief during labor, it is important to highlight that therapeutic showering has characteristics and contributions that differ from those of immersion baths. Johnson et al.[28] asserted that women usually shower in upright positions, including standing, rocking, swaying, squatting or sitting, and that they can change their position in the shower to direct water wherever it is needed to provide pain relief or a soothing effect. Therefore, showering provides numerous benefits during labor that are provided by movement as pain relief, increased sense of self-efficacy, calming and comfort, and perception of control over the environment and the birthing experience.[28]

Stark[18] also stated that therapeutic showering promotes and facilitates physiological labor: the rhythmic impact of warm water can provide a pleasant sensory distraction, the shower allows freedom of movement, and showering involves ambulation because of the necessary walking to get into and out of the shower.

Gayeski et al.[29] assessed the application of non-pharmacologic methods to relieve pain during labor, from the point of view of the primiparous women (n=188), on the day they were discharged from the hospital. They found that warm showers were the second-most-used non-pharmacologic method (91.5%) (emotional support provided by the parturients companion was the first [97.3%]). In this context, it is also important to mention that some authors consider that there is a shortage of scientific evidence to support warm showers as a therapeutic intervention. Of these, emphasis goes to Simkin and O'hara[30], and Stark[18], who contend that while showering is considered an effective coping strategy during labor, research about it is lacking and its effectiveness has not been tested.

Of the studies that assessed the effect of therapeutic showering for pain relief during the first phase of labor, we highlight the work of Davim et al.[31], who observed significant pain relief in parturients after the application of water from a shower at room temperature, and a study conducted by Barbieri et al.[32] in which a warm shower with water at 37ºC was used on the lower back region for 30 minutes, showing no significant difference in the pain score evaluated before the intervention and 1 hour after. As concluded by Barbieri et al.[32], Stark in his study published in 2013[18], highlighted that therapeutic showering did not significantly reduce the perception of pain in participants. In that study, the direction of the flow of the water and the temperature of the water could be adjusted by the parturients and, for safety reasons, they remained seated during the procedure.[18] Pain measurements were carried out 10 minutes after the intervention. The author noted that if pain had been measured before leaving the shower, there might have been a more evident reduction and the results could have been different.

A study by Santana et al.[33] presented different results, pointing to the benefits of therapeutic showering, and concluding that, in the active phase of labor, a 20-minute shower between 37 ºC and 39 ºC was effective in reducing intensity of pain. Similarly, a 2017 study by Stark[17] highlighted that after 30 minutes of therapeutic showering (this length of time was selected based on research conducted by Benfield et al.[34], whose findings with immersion baths showed significant changes after 15 minutes), the intervention group presented statistically significant decreases in pain, discomfort, anxiety and tension, and a significant increase in relaxation, and they concluded that therapeutic showering was effective in reducing pain.

Lee et al.[8] found that average pain was less at 10 minutes post-shower than at 20 minutes post-shower. Although they did not evaluate pain immediately after water application and did not record the location of pain or of water application, they presented results similar to those found in this study that pointed to the effectiveness of therapeutic showering, at least at two times after application. However, at the third time (20 minutes after application), there was a decrease in its effectiveness. Lee et al.[8], who defined 37°C as the appropriate temperature for the intervention for 20 minutes, affirmed that the parturients in the intervention group, who were submitted to warm showers, reported significantly lower scores on the Visual Analog Scale for pain at 4cm and 7cm cervical dilation, and better birth experiences than the control

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group. Regarding water application sites, after a 5 minute full-body or lower-back shower, participants were permitted to direct shower water anywhere that felt most comfortable, although they did not record location of pain or of water application after 5 minutes.

Despite the studies that mention only the beneficial effects of therapeutic showering, it is also important to mention research that does not corroborate these findings. Henrique et al.[1] and Cavalcanti et al.[35] found an increase in pain scores and a shorter labor duration in the group of participants submitted to the intervention.

In terms of research developed to evaluate specific aspects of therapeutic showering, namely temperature, duration of application, and location of application, Hecox et al.[36] argued that the effect of water for pain relief was greater when the temperature varied between 37 °C and 40 °C and was applied in 20-30minute sessions, and Lee et al.[8] maintained that 37 °C was the ideal water temperature.

In the present study, the results showed that time after application in minutes impacted level of pain. Although the pattern for the three times was similar in the interval between 10 and 20 minutes, there was a decrease in the level of pain that was more pronounced immediately after water application, and the results also seemed more consistent because there was lower data dispersion.

Conclusions

Therapeutic showering is a non-pharmacological strategy that, in the first stage of labor, contributes to safe but temporary pain relief, with pain levels that are lower at the time of application (pelvis, lower back and in more than one place) and that increase over time at 10 and 20 minutes, although with greater data dispersion when the pain was located in the lower back region.

It is essential that the benefits of this strategy become accessible to parturients as one of the dimensions of humanized childbirth, and obstetric nurses should promote the exercise of women's right to self-determination, which includes free and informed decisions about non-pharmacological pain relief strategies during the first stage of labor.

This pain relief strategy does not require previous training of women or a need for specific physical resources, since most Portuguese maternity hospitals have warm water showers available in the bathrooms that are accessible to parturients. Nevertheless, it may have some impact on the allocation of human resources, because it implies the availability of nurses to accompany women during the procedure, and there may be some limitations related to personnel restrictions in the context of the SARS-CoV-2.

More research is needed about therapeutic showering that allows it to be evaluated, not only in terms of its effect on pain relief, but also on the evolution of labor and the satisfaction of women and families. Producing and disseminating such knowledge will increase the visibility of therapeutic showering in obstetric nursing practice guidelines, parenting preparation courses, and the standardization of non-pharmacological pain relief methods available in labor and delivery units in Portugal.

Considering that the results show an increase of pain over time, and taking into account other studies that have observed higher levels of pain when measurements were not taken immediately post-intervention, it would be interesting to always assess pain immediately after the intervention and at shorter time intervals, namely 5 and 10 minutes.

Study limitations

Limitations of this study include the sample size, the type of sampling, restrictions due to the SARS-CoV-2 pandemic, and lack of evaluation of shower water temperature, since each participant regulated the temperature based on their preferences.

Authors' contributions

AT: Conception and design of the study; data collection; data analysis and interpretation; statistical analysis; drafting the manuscript; critical review of the manuscript.
FL: Conception ad design of the study; data collection.
RG: Conception ad design of the study; data collection.
HB: Conception ad design of the study; drafting the manuscript; critical review of the manuscript.
LC: Conception ad design of the study; data collection.
AC: Conception and design of the study; data collection; data analysis and interpretation; statistical analysis; drafting the manuscript; critical review of the manuscript.

Conflicts of interest and Funding

The authors declare that they have no conflicts of interest with respect to the authorship or publication of this article. The authors state that the opinions expressed in this article are their own and not from an official position of the institutions or financial agent.

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