

THE EFFECTIVITY OF HYDROXYTHERAPY TOWARDS THE REDUCTION OF LABOR PAIN

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Abstract

The labor pain is a physiological response, however it can cause catecholamine increase. This can disturb uterine contractions until it can cause uterine inertia, old parturition, oxygen in the fetus is not strong until fetus distress, and also the mother's death or the fetus if the labor pain is not handled. Therefore, pain management is important for the mother during the labor. The aim of this study was to know the effectivity of hydrotherapy towards the decrease of labor pain. This study was conducted by employing systematic literature review of 12 articles taken from the PubMed and ProQuest databased. Inclusion criteria (articles 2008-2018, Full text, qualitative study design). Critical Appraisal was done with Joanna Brigs. Furthermore hydrotherapy which is treated on the giving birth mother during the active phase is proven effective in decreasing the pain and anxiety, preventing long parturition, decreasing the action of obstetrics such as episiotomy and amniotomy, increasing the prosperity of the mother and the newborn baby, and giving positive labor experience for the mother. Hydrotherapy is effective in decreasing the labor pain. A further study related to pain management non pharmacology can be conducted deeper.

Keywords : the effectivity; hydroxytherapy; labor pain

1. INTRODUCTION

Childbirth is one of the most important events in the life of women but not infrequent childbirth can cause pain or stress [1]. The factor that plays an important role in childbirth is controlling pain [2]. Pain during childbirth became a concern many women around the world could be one of the causes of stress and chose the birth of Caesar [1]. Pain is necessary to recognize the presence of uterine contractions during childbirth, but sometimes the pain can lead to pathological outcomes if the mother is experiencing persistent pain, plus the anxiety and fear experienced by the mother during childbirth . This can result in fatigue resulting in decreased uterine contractions and the labor process lasts longer. Long Childbirth (ductility labor) may endanger mothers and fetuses [3]. The census of Population Survey Data (SUPAS) in 2015, both AKI and AKB showed a decline of AKI 305/100,000 live births and AKB 22,23/1000 live births (Kemkes, 2016). The cause of the highest BATTERY in 2013 is still the same as the previous year, namely bleeding (30.3%), hypertension (27.1%), infections (7.3%), old partus (1.8%) and abortion (1.3%) (Depkes, 2014). The old Partus is the lowest donor of maternal mortality, but the number has increased from 2010 to 1.0%, 2011%, 1.1% and the year 2012 of 1.8% [3]. The purpose of the preparation of Systematic Literature Review is to seek evidence based on the effectiveness of hydrotherapy to reduce labor pains.

2. MATERIALS AND METHODS

The author filters out 698 literature from 2 databases (Pubmed, Pro Quest) to do the review.

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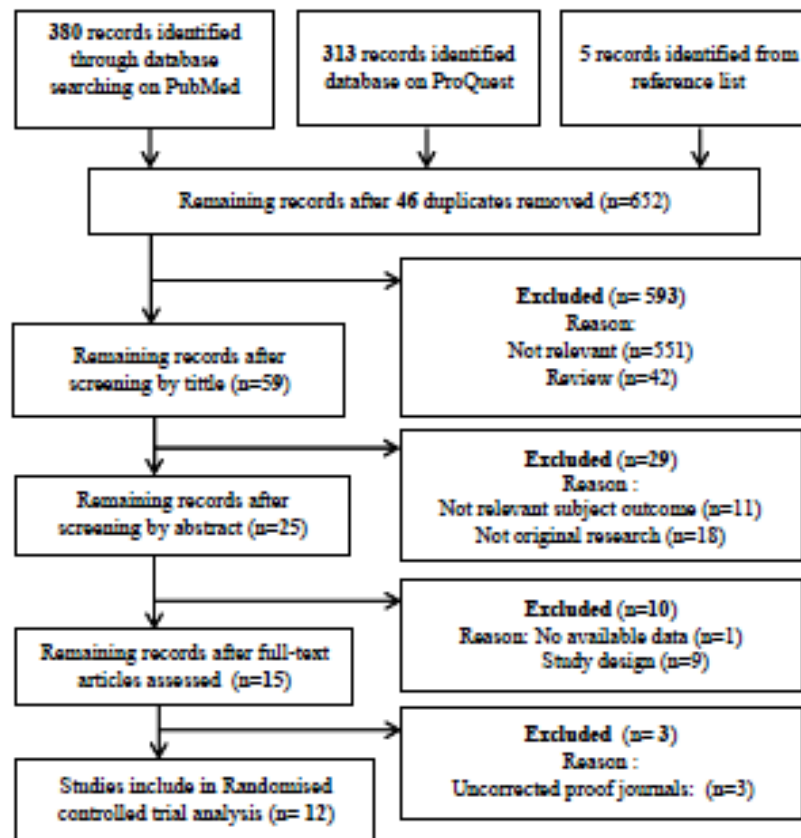


Figure 1. Process of selection articles

All articles are selected using a Scopus indexed quantitative research Methodology with Q1 and Q2 standards. The preparation of Systematic Literature Review is adapted to the Systematic Literature Review steps. The steps of drafting systematic literature review is 1) identification of the problem, 2) prioritizing problems and questions, 3) using frameworks, 4) literature searching using databases, manual searching and grey literature, 5) Choose paper based on inclusion and exclusion criteria, 6) Perform critical appraisal, 7) extracting data from selected paper, 8) collecting data and making efficiency to answer questions. The author performs critical appraisal using a checklist of Joanna Briggs Institute with a study Randomized Controlled Trial (RCT) design and Quasi Experimental Design. Process of selection articles is illustrated in figure 1.

After doing critical appraisal selected 12 articles based on the rating of the author has a good quality and according to the topic, then carried out data extraction to enter key criteria such as title, author, year of publication Articles, research locations, research objectives, methodologies, research populations, and significant outcomes or conclusions.

Table 1. Data Extraction

No	Title/Author/ Year	Country	Aim	Method	Data Collection	Partisipant	Result
1.	<i>A comparative study between the pioneer cohort of waterbirths and conventional vaginal deliveries in an obstetrician-led unit Singapore/</i> Lim et al/2015/	Singapura	To evaluate whether water immersion during labor is related to the severity of the mother and baby compared to conventional labor.	Cohort	Data was obtained from central hospital records, where data was entered after each delivery.	130 subjects were determined in each group that had a power of 90% to show that there were no differences between the two groups.	Water birth is not associated with an increase in the incidence of bad mother or baby. The results of this study support Water birth as a birth option for a group of women without the risk of labor, with supervision by an obstetrician and supported by a professional midwife.
2.	<i>An assessment of the hydrotherapy during the active phase of labor on the labor process and parenting behavior/</i> Tuncay et al/ 2017/Q2	Turkey	To assess the effects of hydrotherapy on the active phase of labor and care applied.	Quasi experimental	Maternity mothers were given information about the purpose of the study, 80 participants agreed to participate and had met the inclusion criteria. Selection of participants was carried out as follows: the first group of mothers who enrolled into the delivery room were included in the experimental group namely hydrotherapy, and the second group was included in the control group.	The number of samples in the experimental group 40 and the control group 40. The participants in the experimental group with dilated cervix 5 cm were taken to the hydrotherapy vessel. This application continues until the cervical dilation reaches 10 cm.	Hydrotherapy applied to mothers giving birth during the active phase of labor has proven to be effective in reducing pain, reducing the duration of birth, increasing the well-being of the mother and newborn.
3.	<i>Comparison of the effects of water birth and traditional delivery on birthing women and newborns/</i>	China	To compare the effects of labor in the water and traditional labor on maternity and newborns.	RCT	Data on mothers giving birth from June 2012 to July 2013 were randomly divided into two groups. 60 women who underwent traditional labor as a control group, while 60	120 primiparas with a single pregnancy, fetal position of the head down, and normal birth were randomly divided	Water delivery can effectively shorten the duration of labor and reduce maternal pain without increasing the risk of labor for the mother and newborn.

able 1. Data Extraction

	Gayiti et al/ 2015/Q2				other women as experimental groups namely water birth.	into two groups.	
4.	<i>Effect of hydrotherapy on pain labor process/</i> Taghavi/2015/Q3	Iran	To find out the effects of hydrotherapy on labor.	<i>A clinical trial study</i>	The population in this study were pregnant women who referred to the Alzahra teaching hospital from Tabriz-Iran TUMS from March 2010 to March 2013. After explaining the research method, mothers were asked to sign a written agreement, and the results were 100 samples, 50 of which were primiparous mothers and 50 multiparous mothers.	100 pregnant women without risk factors were randomly selected and included in the study.	The pain level in the intervention group was significantly lower than the control group and the average labor time at first time in the group intervention was significantly lower than control group.
5.	<i>The effects of immersion in water on labor, birth and newborn and comparison with epidural analgesia and conventional vaginal delivery/</i> Mollamahmutoğlu/ 2011/Q1	Turkey	To compare the condition of the mother and baby in labor in the water and conventional labor and delivery with the use of epidural analgesial	Quasi eksperimen	Interviews and observations on 610 pregnant women admitted to the Zekai Tahir Burak Women's Health Education and Research Hospital, from June 2007 to September 2008. Mothers have been informed about the purpose of this study and asked to sign the respondent's consent sheet.	A total of 207 mothers giving birth in water were compared to 204 conventional delivery mothers and 191 mothers giving vaginal deliveries with epidural analgesia.	The results of this study mention the benefits of labor in water can reduce the duration of second and third stage labor, reduction in pain intensity and reduction of obstetric interventions such as induction or amniotomy.
6.	<i>Non-Pharmacological interventions during childbirth for pain relief, anxiety, and neuroendocrine stress parameters /</i> henrique/ 2018/Q1	Brazil	To analyze the effects of hydrotherapy hot water showers and perineal exercises with balls and see the intensity of pain, anxiety, and stress during labor.	RCT	128 mothers gave birth, in hospitals in São Paulo, Brazil, from June 2013 to February 2014. One hundred thirty-seven (137) women during labor were assessed for their eligibility.	The sample size consisted of 39 mothers in each group. That is Hydrotherapy (GA) group; perineum with ball training group (GB); and the combined intervention group (GC).	Pain, anxiety, and the release of epinephrine decreased in the group that did the perineum with balls (GB). After intervention the β -endorphin level increased in this group (GB). However, no significant differences were observed at the level of cortisol, epinephrine, and norepinephrine.

Table 1. Data Extraction

7.	<i>Effects of passive hydrotherapy WATSU (Water Shiatsu) in the third trimester of pregnancy/ Schitter/2015/ Q1</i>	Switzerland	To evaluate the effects of WATSU on third trimester pregnant women.	<i>Controlled clinical pilot study</i>	Recruitment was conducted from May 2012 to May 2014 by medical staff at the Bern University Hospital, as well as advertisements through midwifery associations at the Canton of Bern. Mothers who fulfill the criteria are given the respondent's consent sheet and then undergo an anamnesa via telephone.	The number of samples in this study were 17 mothers, 9 pregnant women without complications with gestational age ≥ 34 weeks were included in the intervention group (receiving WATSU) and 8 mothers in the control group.	The results showed that WATSU significantly reduced the stress and pain levels of the participants and could improve the quality of life and mood associated with mental health. Compared to the control group, participants in the intervention group experienced a decrease in stress that was felt from day 1 to day 8 ($P = 0.036$, Cohen $f = 0.57$).
8.	<i>Therapeutic showering in labor/ Stark/ 2013/ Q2</i>	USA	To measure the effectiveness of warm water shower therapy for labor pain, overcome anxiety, relaxation, and fatigue in labor.	A quasi-experimental	Uncomplicated single pregnant women are the target population for this study. Because most pregnancies and childbirth are normal, this target population is selected.	Respondents were single pregnant women without complications and were in active period (N = 24).	The results of this study found that the use of warm water showers during labor can significantly increase coping and relaxation and reduce tension and anxiety. Changes in pain and fatigue were not statistically significant. In addition, there were no adverse effects on the respondent after 30 minutes of bathing with warm water.
9.	<i>A randomized controlled trial evaluating the effect of water birth versus land birth/ Barbosa da Silva, et al/ 2009/ Q1</i>	Brazil	To evaluate the effect of soaking warm water on pain during the first stage of labor	RCT	The study was conducted from October 2002 to June 2003 at the Amparo Maternal Normal Birth Center, the center of labor with an average of 1000 births per month, located in the city of Sa'õ Paulo, Brazil, with mothers in the labor process in the active phase.	108 maternity mothers were included in the experimental group with 54 mothers randomly assigned to the control group.	The average labor pain score in the control group was significantly higher than in the experimental group. These findings indicate that warm water baths are a suitable alternative form of pain relief for mothers during labor.
10.	<i>Hydrotherapy and the swiss ball in labor/ Henrique et</i>	Brazil	To find out the effects of warm water showers	RCT	The study took place from 2013 to 2014 in two hospitals, a population of	The sample consisted of 43 mothers in each	The results showed that the use of warm water showers, and perineal exercises by modifying Swiss balls

Table 1. Data Extraction

	al//2016/Q2/		and perineal exercises with Swiss balls, during labor.		128 mothers giving birth. Randomization was carried out and grouped 44 mothers into warm water shower groups, 45 mothers into Swiss ball groups, and 39 mothers into a combination of warm water showers and Swiss balls.	group. Warm water shower group (AG), perineal exercise with Swiss ball (BG), and combined intervention group (CG).	increased the progress of labor. The combination of these interventions shows greater clinical relevance for labor.
11.	<i>Efficacy of warm shower on labor pain and birth experiences during the first labor stage/ Lee/2012/Q1</i>	Taiwan	To find out the effectiveness of a warm shower on labor pain and childbirth experience in the first stage of labor.	RCT	The study was conducted from July 10, 2010 to January 12, 2011 in the maternity ward at a Taipei City regional teaching hospital. 92 pregnant women were randomly assigned to the experimental group and the control group. Overall, 80 mothers who completed the intervention were 41 in the control group and 39 in the experimental group.	The target sample size was 45 participants per group, namely the experimental group who received warm water shower intervention and the control group.	Pain intensity in the intervention group was significantly lower than the control group. Apart from the positive effects of warm water showers, warm water showers are an effective, comfortable, easy and non-pharmacological approach to reduce pain.
12.	<i>The effects of hydrotherapy on anxiety, pain, neuroendocrine responses, and contraction dynamics during labor/ Benfield et al/2014/Q1</i>	East Carolina University.	To find out the effects of hydrotherapy on anxiety and pain during labor.	Quasi eksperimen	Data was taken from the obstetric clinic in the County Health Department and the University of Medicine and from two private obstetricians. For 14 months, identified 135 women who met the inclusion criteria.	Samples that met the inclusion criteria were 45 people.	Hydrotherapy was associated with decreased levels of anxiety, vasopressin and oxytocin in the 15th and 45th minutes (p <05). Pain intensity decreased after being given hydrotherapy intervention.

3. RESULT AND DISCUSSION

Anxiety

Hydrotherapy is associated with significant anxiety reduction in the 15th and minute maternity delivery to 45. The decrease in pain and anxiety was mirrored by a decrease in levels C, in the first 15 minutes of hydrotherapy, C plasma decreased rate of doubled, the level of βE increased, cortisol levels decreased doubled in the mother with a high pain score [4]. The level of maternal anxiety during childbirth is assessed by LAS (Labor Agency Scale). The average LAS score in the hydrotherapy group is 129.45 ± 5.33 lower compared to the control group 44.97 ± 6.09 . These differences are statistically significant. The mother in the hydrotherapy group has a more positive feeling about childbirth because it feels comfortable and more relaxed than the control group [5].

Soaking warm water during childbirth can reduce anxiety, increase the release of endorphins, loosen muscle, and increase buoyancy in water that lowers pressure on limbs and joints so as to give mother freedom to Moving [6]. Warm water can stimulate nerve fibers to cover the cause of pain so that the pain impulses to the spinal cord and the brain will be inhibited. Vasodilation of blood vessels and increase blood flow that can facilitate oxygenation, preventing muscle spasm so that the muscles relax and mothers feel comfortable. Benfield et al (2010) states that the selection of water temperature ranges from 36°C - 37°C , this is because the temperature is equal to the average temperature of the human body. Lee et al (2012) also mentions that the temperature of the 37°C as a warm bathing temperature is ideal. Water at 34°C - 38°C will provide a sense of comfort in the skin, and at 37°C - 40°C the temperature is best for controlling pain when used within 20-30 minutes.

Duration of delivery

The average duration of the delivery of the hydrotherapy group is 5.27 hours and the conventional delivery Group is 6.11 hours [7]. Henrique et al (2016) also mentions that the group receiving the intervention of a combination of warm shower and Swiss (CG) balls is more effective in improving cervical dilatation. The duration of the time I was the most short childbirth in conventional labour groups while the duration of childbirth II and Kala III was the most short in the water Delivery Group. A very significant reduction in the requirements of induction and episiotomy in the Water Delivery Group [8]. The duration of the delivery of the hydrotherapy group is faster 267.5 minutes and 420.7 minutes in the control group with a 95% confidence interval [9]. This is in line with the research conducted by Tuncay et al (2017) i.e. the average duration of the active phase (cervical dilation between 5-10 cm) lasts for 210.18 minutes in the hydrotherapy group and 272.18 minutes in the control group.

Laceration Perineum

The perineum laceration rate is higher in the water Delivery Group, but the majority of these lasers are very minimal [8]. Lim et al (2016) states that from 118 mothers who are pregnant in the water there are no cases of infection in the mother, the third or fourth degree of perineum, or in infants. Mothers in the control group are more likely to undergo an episiotomy action (63.6% vs 0.85%; $p < 0.01$). This is in line with the research conducted by Gayiti (2015) which mentions better perineum integrity in the hydrotherapy group than the control group and lower episiotomy levels of the hydrotherapy group than in the control group.

The limitation of childbirth in water is perineum can not be protected so that the risk of high perineum laceration, and the monitoring of fetal heart rate can not be done continuously. Newborns also can inhale contaminated water so as to increase the risk of neonatal asphyxia [10]. Based on the results of the study conducted by Gayiti (2015) mentions that scores of APGAR (Appearance, Pulse, Grimace, Activity, Respiration) are comparable between experimental groups and control groups in the 1st and 5th minutes after birth. The process of water immersion during childbirth is only done at the time I childbirth while the II is not done in the water to avoid the risk of neonatal asphyxia. Benfield (2014) also mentions no relationship between infection in the mother and fetus or abnormal fetal heartbeat with hydrotherapy delivery [11]

Fetal heart rate

Ganglia fetal heart rate (baseline FHR) remains within normal limits before and after intervention. The hot shower uses (AG) ($p < 0.001$) and a combination of warm shower intervention with the Swiss Ball (CG) intervention ($p < 0.001$) is effective in increasing fetal heart rate [12].

Warm water with precise temperature resembling an intrauterine environment eases the fetal transition from birth to outside world. The ability to float mother in childbirth in water will help for relaxation, while warm water helps relieve pain [13]. Hydrotherapy in warm temperatures enhances peripheral vasodilation that redistributes blood flow and induces muscle relaxation. The hydrostatic pressure of water immersion is physiological to transfer fluid from the extracellular chamber to the intravascular chamber with the potential to reduce blood pressure and edema [14].

Pain level

Research conducted by Da Silva et al (2009) got results that during hydrotherapy, when cervical dilatation 6 cm score VAS (Visual Analogue Scale) lower in the experiment group than the control group (experimental group = 5.03 ± 1.10 , Control group = 8.30 ± 0.52) [6]. When cervical dilatation is 10 cm, the VASE score is significantly lower in the experimental group (experimental group = 7.63 control group = 9.53), it is in line with Lee et al (2013) stating that the average pain score for the hydrotherapy group.

Significantly lower than the control group ($\beta = -1.48$, 4 cm and $\beta = -1.65$, 7 cm) [15]. Taghavi (2015) mentions that maternity pain intensity based on NRS (Numeric Rating Scale) in the intervention group is lower than the control group namely 7.1 ± 0.85 and 7.6 ± 0.95 in the control group [16]. Henrique et al (2016) also mentions that the median intensity of labor pain in the hydrotherapy group was significantly lower than the control group ($P = 0.010$) in line with the research of Gayiti et al (2015) and Lee et al (2013) which mentions scores [15]. Pain significantly lower the hydrotherapy group ($\beta = -1.48$, 4 cm and $\beta = -1.65$, 7 cm) than the control group.

Pain is a common symptom of mothers during childbirth. Pain characteristics consist of a person's cultural, social, emotional, and even economic concept. Pain and stress in childbirth can cause old partus and increased catecholamines [16]. Other hormones that are influential during pregnancy and childbirth are cortisol. Increased cortisol during childbirth helps maintain the balance of glucose, preventing hypoglycemia due to stress due to labor pains [12]. Childbirth in water can reduce the pain of childbirth, shorten the duration of childbirth, and benefit the adaptation of the newborn with the new environment

[7]. Various theories have explained why warm water when Mother's soak can reduce labor pains. The average weight of mother body type is lower than the water weight, making it easier for mothers to choose

a relaxed and comfortable position. This circumstance, combined with the benefits of warm water that can produce a sedative effect that can reduce pain, stress and anxiety [10].

4. CONCLUSION

Based on the systematic literature review concluded that the highest pain score measured using the VASE (Visual Analogue Scale) measuring instrument in the experimental group was 8.5 and in the 9.3 control group. The lowest pain score in the 4.21 experiment group and in the 5.29 control group. The article explains that hydrotherapy applied to maternity mothers during active phases is proven effective in alleviating pain and anxiety, preventing prolonged partus, reducing obstetric measures such as episiotomy and amniotomy, Improve the welfare of mothers and newborns, and provide a positive maternity experience for mothers.

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