

# The Effect of Hydrotherapy Applied During the Active Phase of Labor on Postpartum Depression: A Case-Control Study

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**ABSTRACT Objective:** This study aimed to compare postpartum depression using the Edinburgh Postpartum Depression Scale (EPDS) and the Beck Depression Inventory (BDI) between the pregnant women who gave birth after hydrotherapy applied during the active phase of labor and those who had conventional delivery. **Material and Methods:** Between March 2017 and March 2019, 337 pregnant women who gave birth after hydrotherapy applied during the active phase of labor and as the control group, 101 pregnant women who gave birth after spontaneous labor in the same period were included in the study. Demographic characteristics, mode of delivery (vaginal or cesarean section), the visual analog scale (VAS) values for labor pain at the 5<sup>th</sup> and 10<sup>th</sup> cm dilatation of the cervix, newborn weight, and gender, presence of maternal and neonatal complications, APGAR scores were recorded. EPDS and BDI were applied by phone in the 6<sup>th</sup> week postpartum. **Results:** Median gravida, parity, 1<sup>st</sup> and 5<sup>th</sup> minute APGAR scores, VAS at the 5<sup>th</sup> cm dilatation of the cervix were significantly lower in the hydrotherapy group than in the control group. The number of educated patients, the rate of the nuclear family, and the rate of being educated at the pregnancy school were higher in the hydrotherapy group than in the control group. There was no difference between hydrotherapy group and controls in terms of EPDS and BDI scores, mode of delivery, maternal complications, neonatal intensive care unit admission rate. **Conclusion:** Labour with hydrotherapy may reduce pain in the intrapartum period but doesn't affect postpartum depression.

**Keywords:** Labor with hydrotherapy; postpartum depression; Edinburgh Postpartum Depression Scale; Beck Depression Inventory for Primary Care; visual analog scale score

The pregnancy and birth process is an important condition that seriously affects the physiological and psychological state of women, as well as their social and family lives. Different levels of mental problems may occur in some women who have difficulty adapting to this situation.<sup>1</sup> Antenatal and postpartum depression is seen in 10% of women.<sup>2</sup> Postpartum depression is a very important condition as it seriously affects the mother, baby, and other family members.<sup>3</sup>

Women prefer cesarean section due to lack of knowledge in the prenatal period, desire to avoid pain and fear. Some pharmacological (epidural analgesia) and non-pharmacological (maternal movements and positions, acupuncture, massage, hydrotherapy)

methods are used to reduce pain during labor.<sup>4</sup> Studies are reporting that hydrotherapy increases uterine perfusion, causes less painful contractions, shortens the time of delivery and reduces the level of anxiety.<sup>5</sup> It was known that labor pain is one of the worst pain experience in women in their life time.<sup>6</sup> Ding et al. reported that epidural labour analgesia decreased the risk of postpartum depression (14.0% vs 34.6%). Additionally attendance at childbirth classes during pregnancy and breastfeeding after delivery were associated with decreased risk of postpartum depression.<sup>7</sup>

Edinburgh Postpartum Depression Scale (EPDS) is a screening scale developed by Cox et al. to determine the risk of depression in postpartum women.<sup>8</sup>

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The Beck Depression Inventory (BDI), which is frequently used to diagnose depression, is an internationally accepted scale prepared to determine the severity of depression symptoms.<sup>9</sup>

The current study aims to investigate whether there is a difference in postpartum depression using the EPDS and the BDI between the pregnant women who gave birth after hydrotherapy applied during the active phase of labor and those who gave birth after spontaneous labor follow-up.

## MATERIAL AND METHODS

This case control study was conducted in conformity with the Declaration of Helsinki and the protocol was approved by the Etik Zübeyde Hanım Gynecology Training and Research Hospital Ethics Committee (date: August 26, 2020, no: 2020/120). Informed consent was obtained from all participants. Between March 2017 and March 2019, 337 pregnant women who were applied hydrotherapy during the active phase of labor in our hospital were included in the study. In addition, 101 term singleton pregnant patients with head presentation, normal estimated fetal weight, category-1 fetal heart rate tracing in non-stress test (NST) (basal rate: 110-160 beats/min, NST with normal variability, with acceleration, without any deceleration), without systemic disease, and who gave birth in the same period were included in the study as the control group.<sup>10</sup> BDI and EPDS were applied to the patients by telephone in the 6<sup>th</sup> week postpartum. Patients who had mental retardation, did not speak Turkish, had a known psychiatric disease, were diagnosed with depression before and during pregnancy, and did not want to participate in the study voluntarily were excluded from the study.

The number of samples required for the research was determined using the G\*Power 3.1 program (G\*Power ver 3.1.9.2, Axel Buchner, Universität Kiel, Germany) before the data collection phase. When the effect size was 0.5, the alpha level was 0.05, and the power was 95%, the total sample number was 210, 105 for each group.<sup>11</sup>

The family-type consisting of many members such as mother, father, children, grandparents, etc.,

was defined as the extended family. In contrast, the family type consisting of only parents and children was defined as the nuclear family.<sup>12</sup>

## LABOR WITH HYDROTHERAPY

### Eligibility Criteria For Labor With Hydrotherapy

1) Head presentation, 2) Singleton pregnancy, normal fetal weight, 3) 37<sup>th</sup> gestational week and above, 4) Category-1 fetal heart rate tracing, 5) Body mass index (BMI) <40 kg/m<sup>2</sup>, 6) Patients with premature rupture of the membranes with clear flow <12 hours.

### Contraindications For Labor With Hydrotherapy

1) Abnormal vaginal bleeding, 2) Maternal fever >37.5°C, 3) Malpresentation, 4) Multiple pregnancies, preterm labor, placenta previa, 5) The previous birth was a cesarean section, 6) The presence of other diseases such as diabetes mellitus, hypertension, heart disease in the mother, 7) Meconium in the amniotic fluid.

Patients who met the eligibility criteria for applying hydrotherapy during the active phase of labor and had no contraindications and whose written consent was obtained were followed up in the “hydrotherapy labor”. The patients were taken to a private pool filled with water at 22°C after vaginal examination, and NST and heartbeat tracings were determined to be Category-1. They were taken out of the pool every two hours, and cervical dilatation, effacement and head level were followed by NST follow-up and vaginal examination. In the second stage of labor, the patient was removed from the pool. The delivery was performed vaginally on the delivery room or by cesarean section if deemed necessary at any stage of labor.

Age, gravida, parity, BMI, gestational week according to the last menstruation date, education status, family type (nuclear, extended family), history of working in an income-generating job, whether there was a planned pregnancy and education at a pregnancy school were recorded. In addition, drug, cigarette-alcohol use were determined. Vaginal examination of patients at admission to the delivery room, type of birth, newborn weight and gender,

presence of maternal (perineal dysuria, postpartum hemorrhage) complications, the 1<sup>st</sup> and 5<sup>th</sup> minute APGAR scores, the neonatal intensive care unit (NICU) hospitalization status, and the visual analog scale (VAS) values at the 5<sup>th</sup> and 10<sup>th</sup> cm dilatation of the cervix were recorded.

### EPDS

The most widely used scale around the world to diagnose postpartum depression is the self report, 10-item EPDS. The Turkish scale validation was done by Engindeniz et al. in our country. Each question is of a four-point Likert type, and all questions are scored between 0-3 points. The highest score is 30, and the cutoff point is 13.<sup>13</sup>

### BDI-II

This is a 21 item self reporting questionnaire for detecting depression in normal population or evaluating the severity of depression in clinical population. BDI's Turkish validity and reliability were published in 2005. The cutoff point is 17, and the highest score is 63.<sup>14</sup>

EPDS and BDI were applied by calling the patients by phone in the 6<sup>th</sup> week postpartum. The scale was administered to each patient by the same person (SA) to ensure standardization. In addition, the demographic characteristics of the patient and control groups were compared in terms of EPDS and BDI, and the effect of hydrotherapy on postpartum depression was investigated.

### STATISTICAL ANALYSIS

The mean, standard deviation, median minimum, maximum, frequency, and ratio values were used in the descriptive statistics of the data. The distribution of variables was measured with the Kolmogorov-Smirnov test. The Mann-Whitney U test was used in the analysis of independent quantitative data. The chi-square test was used to analyze independent qualitative data, and the Fischer test was used when the chi-square test conditions were not met. SPSS program (version 27.0 for Windows; SPSS, Inc., Chicago, IL) was used in the analysis.  $p < 0.05$  was considered significant.

## RESULTS

A total of 448 patients (337 patients in the hydrotherapy group, 101 patients in the control group) were included in the study. There was no significant difference between the groups in terms of mean age ( $25.9 \pm 5.1$  vs.  $26.6 \pm 5.1$  year) and BMI ( $28.8 \pm 3.7$  vs.  $29.3 \pm 4.9$  kg/m<sup>2</sup>) ( $p \geq 0.05$ ). However, median gravida and parity were significantly ( $p < 0.05$ ) lower in the hydrotherapy group than in the control group.

The number of educated patients was higher in the hydrotherapy group than in the control group ( $p = 0.000$ ). When family type was compared, 30.7% ( $n = 32$ ) of the patients in the control group came from an extended family, and 68.3% ( $n = 69$ ) came from a nuclear family. In the hydrotherapy group, 17.5% ( $n = 59$ ) of the patients came from an extended family, and 82.5% ( $n = 278$ ) of the patients came from a nuclear family. The rate of the nuclear family in the hydrotherapy group was significantly higher than in the control group ( $p = 0.003$ ) (Table 1).

There was no significant difference between the groups in the rate of patients working in an income-generating job, the rate of a planned pregnancy, the rate of smoking-alcohol and drug use ( $p \geq 0.05$ ). The rate of patients who were attendant at childbirth classes during pregnancy was 2.9% ( $n = 3$ ) in the control group and 11.3% ( $n = 38$ ) in the hydrotherapy group. The attendance at childbirth classes was significantly higher in the hydrotherapy group than in the control group ( $p = 0.001$ ) (Table 1).

Mean week of gestation, mode of delivery, newborn gender ratio and birth weight values were found to be similar in the two groups ( $p \geq 0.05$ ). When evaluated regarding maternal prognosis, one patient in the hydrotherapy group had shoulder dystocia, and one patient had third-degree episiotomy dysuria (0.6%). At the same time, there was no complication in the control group. There was no difference between the two groups in terms of complications ( $p \geq 0.05$ ). In terms of neonatal prognosis, 1<sup>st</sup> and 5<sup>th</sup> minute APGAR scores in the control group were significantly higher than in the hydrotherapy group ( $p = 0.000$ ). Still, the NICU admission rate was similar between the two groups ( $p \geq 0.05$ ). The pain thresh-

**TABLE 1:** Sociodemographic characteristics of the patients who were applied hydrotherapy during the active phase of labor and patients in the control group.

	Control group (n=101)		Hydrotherapy group (n=337)		p value
	X±SD/n-%		X±SD/n-%		
Age (year)	26.2±5.1		25.9±5.1		0.646 <sup>m</sup>
BMI (kg/m <sup>2</sup> )	29.3±4.9		28.2±3.7		0.056 <sup>m</sup>
Gravida median (minimum-maximum)	2 (0-7)		1 (1-5)		<b>0.002<sup>m</sup></b>
Parity median (minimum-maximum)	1 (0-5)		0 (0-3)		<b>0.000<sup>m</sup></b>
Educational background					
None	11	10.9%	2	0.6%	<b>0.000x<sup>2</sup></b>
Primary school	47	46.5%	149	44.2%	
High school	31	30.7%	130	38.6%	
University	12	11.9%	56	16.6%	
Family type					
Extended family	32	30.7%	59	17.5%	<b>0.003x<sup>2</sup></b>
Nuclear family	69	68.3%	278	82.5%	
Patient working in an income generating job	9	8.9%	45	13.4%	0.234x <sup>2</sup>
Planned pregnancy	83	82.2%	280	83.1%	0.832x <sup>2</sup>
Attendance at childbirth classes during pregnancy	3	3%	38	1.3%	<b>0.000x<sup>2</sup></b>
Use of medication	6	5.9%	15	4.5%	0.539x <sup>2</sup>
Smoking-alcohol use	3	3%	23	6.8%	0.150x <sup>2</sup>

<sup>m</sup>Mann-Whitney U test; <sup>x<sup>2</sup></sup>Chi-square test; SD: Standard deviation; BMI: Body mass index.

**TABLE 2:** Maternal, fetal and neonatal characteristics of patients who were applied hydrotherapy during the active phase of labor and patients in the control group.

	Control group (n=101)		Hydrotherapy group (n=337)		p value	
	X±SD/n-%	Median	X±SD/n-%	Median		
Maternal characteristics						
Gestational age (week)	39.25±1.24	39.4	39.44±1.37	39.5	0.065 <sup>m</sup>	
VAS score						
At 5 cm cervical dilatation	8.16±1.36	8	4.91±2.38	5.0	0.000 <sup>m</sup>	
At 10 cm cervical dilatation	9.17±1.15	10	9.42±0.62	9.0	0.741 <sup>m</sup>	
Mode of delivery	C/S	17	16.8%	48	14.2%	0.520x <sup>2</sup>
	Vaginal	84	83.2%	289	85.8%	
Neonatal characteristics						
Gender	Male	48	47.5%	147	43.6%	0.439x <sup>2</sup>
	Female	53	52.5%	197	58.5%	
Neonatal weight	3,332±750	3,245	3,309±367	3,300	0.372 <sup>m</sup>	
Complication at birth	0	0%		14	4.2%	0.037x <sup>2</sup>
Neonatal ICU admission	3	3%		7	2.1%	0.598x <sup>2</sup>
Apgar score 1 <sup>st</sup> min.	8.91±0.47	9	9.00±0.00	9.0	0.000 <sup>m</sup>	
Apgar score 5 <sup>th</sup> min.	9.92±0.42	10	10.00±0.00	10.0	0.000 <sup>m</sup>	

<sup>m</sup>Mann-Whitney U test; <sup>x<sup>2</sup></sup>Chi-square test; SD: Standard deviation; VAS: Visual analogue scale; C/S: Caesarean section; ICU: Intensive care unit.

old of the patients was evaluated with the VAS score. While the cervical dilation was 5 cm, the VAS score was 8.16±1.36 in the control group and 4.91±2.38 in the hydrotherapy group, so the VAS score was significantly lower in the hydrotherapy group (p=0.000).

The VAS score during full cervical dilation was 9.17±1.15 in the control group and 9.42±0.62 in the hydrotherapy group. There was no significant difference between the groups regarding VAS score during full cervical dilation (p=0.741) (Table 2).

**TABLE 3:** Comparison of the mean scores of the Edinburgh Postpartum Depression Scale and Beck Depression Inventory of the groups.

	Control group $\bar{X}\pm SD$	Hydrotherapy group $\bar{X}\pm SD$	p value
Edinburg Postpartum Depression Scale	8.16±1.23	8.18±1.25	0.759 <sup>m</sup>
Beck Depression Inventory	12.75±1.17	12.80±1.19	0.723 <sup>m</sup>

<sup>m</sup>Mann-Whitney U test; SD: Standard deviation.

EPDS was measured as 8.16±1.23 and 8.18±1.25 points in the hydrotherapy group and control groups, respectively. There was no difference between the two groups in terms of EPDS ( $p=0.759$ ). BDI was measured as 12.75±1.17 points in the control group and 12.80±1.19 points in the hydrotherapy group. There was no significant difference between the groups in terms of BDI ( $p=0.723$ ) (Table 3).

## DISCUSSION

In this study, in which hydrotherapy applied during the active phase of labor was examined in terms of obstetric prognosis and postpartum depression, it was determined that women who gave birth with hydrotherapy applied during the active phase of labor were more educated and had higher rates of living in a nuclear family and being educated in a pregnancy school. When the cervical dilatation was 5 cm, the VAS score was significantly lower in the hydrotherapy group. Both EPDS and BDI were applied in the current study. There was no significant difference between the groups in terms of depression scales.

According to the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-V), Postpartum depression is defined as moderate to severe depression with onset during the first year after birth, especially starts within six weeks after delivery.<sup>15</sup> The estimated prevalence is 9%.<sup>16,17</sup> The American College of Obstetricians and Gynecologists recommends that obstetricians should screen women at least once during the perinatal period for depression symptoms.<sup>18</sup> Young age, multiparity, fear of childbirth, lower education, smoking, traumatic birth experience, low level of social support, employment status,

low hemoglobin levels, are identified as the risk factors of postpartum depression.<sup>18,19</sup> In a meta-analysis from Middle East countries, the prevalence of postpartum depression was 27%, and risk factors were listed as poor economic level, pregnancy associated complications, low education, unplanned pregnancy, inadequate social support from family members.<sup>20</sup> When considering the risk factors of postpartum depression, more than 50% of patients both in the hydrotherapy and control groups were young, educated, lived in a nuclear family, and had a planned pregnancy. Therefore, in the current study, there was no difference between groups in terms of depression scales.

Güneş and Irmak Vural reported that hydrotherapy was effective in reducing labour pain in the active phase of labour, increasing birth comfort and reducing birth anxiety.<sup>21</sup> Cochrane review found that immersion in water gave pain relief and also gave better satisfaction with childbirth.<sup>22</sup> Benfield was published that hydrotherapy during labor also affects neuroendocrine responses. Anxiety, vasopressin and oxytocin levels were found to decrease at 15 and 45 min of hydrotherapy.<sup>23</sup> Chen et al. reported that increased postpartum pain sensitivity was associated with high EPDS score.<sup>21,24</sup> In the current study, there was no significant difference between the results of EPDS and the BDI, which were applied to evaluate postpartum depression by contacting the patients by telephone during the postpartum period. In a study conducted by Ghasemi et al., in which the pregnant women included in the study were followed up to eight months postpartum, an evaluation was made with the EPDS, and there was no significant difference between water birth and land birth groups, similar to the results of our study.<sup>25</sup> In another study conducted by Taha and evaluated the EPDS at the sixth week postpartum, there was no difference between the groups.<sup>26</sup>

When analyzing the socio-demographic data of our patients, it was seen that pregnant women who were applied hydrotherapy during the active phase of labor were more educated, had a higher rate of living in a nuclear family, and had a higher rate of being educated in a pregnancy school. In a study conducted by Reyhan and Sayiner on a pregnant group with similar demographic characteristics as the patients in the

current study, it was aimed to evaluate the knowledge and thoughts of pregnant women about water birth by watching a video of water birth, and it was found that those with sufficient knowledge about water birth were in the more educated group.<sup>27</sup> In addition, it was concluded that those who had adequate information about water birth from pregnancy school or various sources during pregnancy preferred water birth more. This result is also similar to the data of our study. It is considered that the increase in education and knowledge level in pregnant women will increase the preference for water birth as a birth method.

A study by Nutter et al. revealed that water birth reduces labor pain with its hydrostatic pressure effect and other neuro-modulatory effects. In addition, it reduces the need for analgesia during labor.<sup>28</sup> In the current study, patients' pain was evaluated with a VAS performed when cervical dilatation was 5 cm and 10 cm. While cervical dilatation was 5 cm, the VAS score was lower in the hydrotherapy group. In the study conducted by da Silva and de Oliveria when compared the VAS scores measured at the beginning of the water birth application and one hour later, lower values were measured in the pregnant women who underwent water birth.<sup>29,30</sup>

Although the 1<sup>st</sup> and 5<sup>th</sup> minute APGAR scores were higher in the group of pregnant women who gave birth in water in terms of neonatal prognosis in the current study, the difference in APGAR scores was not considered because the NICU hospitalization rates were similar. In a survey by Ghasemi et al. performed on two hundred patients, no difference was observed in terms of APGAR scores and NICU hospitalization rates between pregnant women who gave birth in water and those who gave birth conventionally.<sup>25,28</sup>

Our study included more pregnant women than those included in other studies, and that the BDI was also used makes it different from other studies.

The fact that the number of patients differed by three times in terms of study groups is the first limitation of the study. The application of EPDS and BDI tests on the phone is the second limitation of the study.

## CONCLUSION

The intrapartum and postpartum period is a period that can cause stress and anxiety disorder in women's lives and is often overlooked. Considering the factors that may cause stress and anxiety disorders in the intrapartum and postpartum period, the option of water birth is promising in terms of reducing pain in the intrapartum period. Large-scale randomized studies are needed to investigate the effects of hydrotherapy on postpartum depression.

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### Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

### Authorship Contributions

**Idea/Concept:** Sezin Ertürk Aksakal; **Design:** Yaprak Engin Üstün; **Control/Supervision:** Yaprak Engin Üstün; **Data Collection and/or Processing:** Caner Köse, Doğukan Özkan; **Analysis and/or Interpretation:** Ramazan Erda Pay; **Literature Review:** Sezin Ertürk Aksakal, Ramazan Erda Pay; **Writing the Article:** Sezin Ertürk Aksakal, Ramazan Erda Pay; **Critical Review:** Yaprak Engin Üstün, Caner Köse; **References and Findings:** Sezin Ertürk Aksakal; **Materials:** Sezin Ertürk Aksakal, Caner Köse, Doğukan Özkan.

## REFERENCES

- Dennis CL. Can we identify mothers at risk for postpartum depression in the immediate postpartum period using the Edinburgh Postnatal Depression Scale? *J Affect Disord*. 2004;78(2):163-9. [[Crossref](#)] [[PubMed](#)]
- Gavin NI, Gaynes BN, Lohr KN, Meltzer-Brody S, Gartlehner G, Swinson T. Perinatal depression: a systematic review of prevalence and incidence. *Obstet Gynecol*. 2005;106(5 Pt 1):1071-83. [[Crossref](#)] [[PubMed](#)]
- Grigoriadis S, VonderPorten EH, Mamisashvili L, Tomlinson G, Dennis CL, Koren G, et al. The impact of maternal depression during pregnancy on perinatal outcomes: a systematic review and meta-analysis. *J Clin Psychiatry*. 2013;74(4):e321-41. [[Crossref](#)] [[PubMed](#)]
- Simkin P, Bolding A. Update on nonpharmacologic approaches to relieve labor pain and prevent suffering. *J Midwifery Womens Health*. 2004;49(6):489-504. [[Crossref](#)] [[PubMed](#)]
- Cluett ER, Burns E. Immersion in water in labour and birth. *Cochrane Database Syst Rev*. 2009;(2):CD000111. Update in: *Cochrane Database Syst Rev*. 2018;5:CD000111. [[PubMed](#)] [[PMC](#)]
- Melzack R. The myth of painless childbirth (the John J. Bonica lecture). *Pain*. 1984;19(4):321-37. [[Crossref](#)] [[PubMed](#)]
- Ding T, Wang DX, Qu Y, Chen Q, Zhu SN. Epidural labor analgesia is associated with a decreased risk of postpartum depression: a prospective cohort study. *Anesth Analg*. 2014;119(2):383-92. [[Crossref](#)] [[PubMed](#)]
- Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry*. 1987;150:782-6. [[Crossref](#)] [[PubMed](#)]
- Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry*. 1961;4:561-71. [[Crossref](#)] [[PubMed](#)]
- ACOG Practice Bulletin No. 106: Intrapartum fetal heart rate monitoring: nomenclature, interpretation, and general management principles. *Obstet Gynecol*. 2009;114(1):192-202. [[Crossref](#)] [[PubMed](#)]
- Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G\*Power 3.1: tests for correlation and regression analyses. *Behav Res Methods*. 2009;41(4):1149-60. [[Crossref](#)] [[PubMed](#)]
- Canatan K. Türk ailesinin tarihsel gelişimi. Canatan K, Yıldırım E, editörler. *Aile Sosyolojisi*. 3. Baskı. İstanbul: Açılım Kitap; 2013. p.97-119.
- Engindeniz AN, Küey L, Kültür S. Edinburg Doğum Sonrası Depresyon Ölçeği Türkçe Formu geçerlilik ve güvenilirlik çalışması. *Bahar Sempozyumları* 1997;1(1):51-2.
- Aktürk Z, Dağdeviren N, Türe M, Tuğlu C. Birinci basamak için Beck Depresyon Tarama Ölçeği'nin Türkçe çeviriminin geçerlik ve güvenilirliği [The reliability and validity analysis of the Turkish version of Beck Depression Inventory for primary care]. *Türkiye Aile Hekimliği Dergisi*. 2005;9(3):117-22. [[Link](#)]
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington, VA: American Psychiatric Association; 2013. [[Crossref](#)]
- O'Hara MW, Wisner KL. Perinatal mental illness: definition, description and aetiology. *Best Pract Res Clin Obstet Gynaecol*. 2014;28(1):3-12. [[Crossref](#)] [[PubMed](#)] [[PMC](#)]
- Vesga-López O, Blanco C, Keyes K, Olfson M, Grant BF, Hasin DS. Psychiatric disorders in pregnant and postpartum women in the United States. *Arch Gen Psychiatry*. 2008;65(7):805-15. [[Crossref](#)] [[PubMed](#)] [[PMC](#)]
- ACOG Committee Opinion No. 757: screening for perinatal depression. *Obstet Gynecol*. 2018;132(5):e208-e12. [[Crossref](#)] [[PubMed](#)]
- Ghaedrahmati M, Kazemi A, Kheirabadi G, Ebrahimi A, Bahrami M. Postpartum depression risk factors: a narrative review. *J Educ Health Promot*. 2017;6:60. [[PubMed](#)] [[PMC](#)]
- Alshikh Ahmad H, Alkhatib A, Luo J. Prevalence and risk factors of postpartum depression in the Middle East: a systematic review and meta-analysis. *BMC Pregnancy Childbirth*. 2021;21(1):542. [[Crossref](#)] [[PubMed](#)] [[PMC](#)]
- Güneş M, Irmak Vural P. Travayda gebelere uygulanan hidroterapinin doğum endişesi ve konfor düzeyine etkisi: randomize kontrollü bir çalışma [The effect of hydrotherapy on birth comfort level and worry about birth in labour: a randomized controlled study]. *YOBÜ Sağlık Bilimleri Fakültesi Dergisi*. 2022;3(1):36-45. [[Link](#)]
- Jones L, Othman M, Dowswell T, Alfirevic Z, Gates S, Newburn M, et al. Pain management for women in labour: an overview of systematic reviews. *Cochrane Database Syst Rev*. 2012;2012(3):CD009234. [[Crossref](#)] [[PubMed](#)] [[PMC](#)]
- Benfield RD, Hortobágyi T, Tanner CJ, Swanson M, Heitkemper MM, Newton ER. The effects of hydrotherapy on anxiety, pain, neuroendocrine responses, and contraction dynamics during labor. *Biol Res Nurs*. 2010;12(1):28-36. [[Crossref](#)] [[PubMed](#)] [[PMC](#)]
- Chen Y, Ye X, Wu H, Huang X, Ke C, Chen Y, et al. Association of postpartum pain sensitivity and postpartum depression: a prospective observational study. *Pain Ther*. 2021;10(2):1619-33. [[Crossref](#)] [[PubMed](#)] [[PMC](#)]
- Ghasemi M, Tara F, Hami A. Comparison between water birth and land birth in terms of fetal and neonatal outcomes. *Iranian Journal of Neonatology*. 2014;5:4-5. [[Crossref](#)]
- Taha M. The effects of water on labour: a randomised controlled trial [Thesis, Midwifery and Neonatology Nursing Science]. Johannesburg: Rand Afrikaans University; 2000. [Erişim Tarihi: 05.09.2012] [[Link](#)]
- Reyhan F, Sayiner FD. What do pregnant women in Turkey think about water birth? *International Journal of Caring Sciences*. 2019;12(1):305-12. [[Link](#)]
- Nutter E, Meyer S, Shaw-Battista J, Marowitz A. Waterbirth: an integrative analysis of peer-reviewed literature. *J Midwifery Womens Health*. 2014;59(3):286-319. [[Crossref](#)] [[PubMed](#)]
- da Silva FM, de Oliveira SM. O efeito do banho de imersão na duração do trabalho de parto [The effect of immersion baths on the length of childbirth labor]. *Rev Esc Enferm USP*. 2006;40(1):57-63. Portuguese. [[Crossref](#)] [[PubMed](#)]
- Wiklund I, Edman G, Ryding EL, Andolf E. Expectation and experiences of childbirth in primiparae with caesarean section. *BJOG*. 2008;115(3):324-31. [[Crossref](#)] [[PubMed](#)]