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10.4103/jehp.jehp_8_24

Investigating the impact of haptotherapy on maternal–fetal attachment in unplanned pregnancies

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Abstract:

BACKGROUND: Mothers who experience unplanned pregnancies tend to show less maternal attachment to the fetus, which can lead to diminished self-care during pregnancy, and affect well-being of the fetus. Consequently, unintended pregnancies are associated with heightened maternal and fetal consequences due to mothers' negligence. Hippotherapy intervention has emerged as a viable approach to enhance maternal-fetal communication. The ultimate goal of this study was to broaden our current understanding of haptotherapy's impact on maternal-fetal attachment in unplanned pregnancies.

MATERIALS AND METHODS: This field trial research was conducted at comprehensive health centers in Isfahan using convenient sampling method. The study consisted of two groups of mothers, each consisting of 33 individuals with unplanned pregnancies between 20 to 24 weeks. The experimental group received haptotherapy intervention for 10 weeks, while the control group received standard pregnancy care. For data collection the participants were given demographic and fertility questionnaire prior to the study, and Cranley's maternal-fetal attachment questionnaire both before and after the study. Moreover, T-test, Mann-Whitney U test, and Chi-square test were used for data analysis.

RESULTS: Prior to the intervention, there was no significant difference in the average maternal-fetal attachment scores between the experimental and control groups ($P = 0.56$). However, a significant increase became apparent after the intervention. The experimental group exhibited a significant improvement in the mean attachment scores compared to their pre-intervention levels ($t = -9.20$, $P = 0 < 0.001$). In contrast, the control group's score remained unchanged, with no significant difference observed ($t = 1.69$, $P = 0.1$).

CONCLUSION: Haptotherapy has been found to enhance maternal-fetal attachment in mothers experiencing unplanned pregnancies. This valuable intervention is recommended as an innovative and secure approach in maternal health care services to help reduce the potential complications associated with such pregnancies.

Keywords:

Maternal-fetal relations, unplanned pregnancy, painting, fetal movements, attachment

Introduction

Pregnancy represents a significant period in the lives of couples. Expectant mothers undergo various physical and psychological transformations to which they typically acclimate. Mothers coexist with their fetus, forming mental images and

establishing a connection with the unborn child. Researchers have characterized this connection as the maternal-fetal attachment.^[1] The attachment begins when the mother becomes aware of her pregnancy and reaches its peak in the third trimester.^[2] Mothers with a stronger attachment to their fetus during pregnancy also establish a better connection with their infant during

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How to cite this article: Atabakhsh T, Salehi K, Mohammadi F. Investigating the impact of haptotherapy on maternal–fetal attachment in unplanned pregnancies. J Edu Health Promot 2024;13:301.

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Received: 02-01-2024

Accepted: 26-02-2024

Published: 29-08-2024

postpartum.^[3] Attachment leads to positive behaviors, such as quitting smoking and alcohol, timely prenatal care, proper nutrition, and better weight gain during pregnancy.^[4] This attachment also enhances the emotional, cognitive, and social development of the child.^[5]

Various factors influence the development of maternal-fetal attachment, and the desire to get pregnant is one such factor. Research indicates that women who intentionally plan their pregnancies, exhibit a stronger inclination to establish a connection with their fetus and, consequently, experience a heightened level of attachment to the fetus compared to those with unplanned pregnancies.^[6,7] Therefore, the likelihood of neonatal complications such as preterm birth and low birth weight increases in unplanned pregnancies. Maternal complications including anemia, preeclampsia, urinary tract infection, stress, and postpartum depression are also common in these cases.^[8] Hence, it is imperative to implement measures that foster maternal attachment to the fetus and encourage acceptance of the pregnancy to mitigate the adverse outcomes of unplanned pregnancies.

Various approaches are available for improving the communication and attachment between the mother and fetus, including yoga, relaxation techniques, cognitive-behavioral interventions, pregnancy adaptation training, guided imagery, counseling, haptotherapy, and others.^[9,10] One of these methods, known as haptotherapy, essentially focuses on the mind-body connection. It encourages individuals to remain true to their natural emotional experiences and pay attention to the physical symptoms of these emotions; because the inclination to conform in social interactions and rational behavior leads individuals to suppress their natural feelings. As a result, they may experience heightened self-confidence, inner peace, freedom, and a greater sense of authenticity. Haptotherapy is an individual-oriented treatment used to address various issues such as negative body image, communication difficulties, challenges related to life transitions, nervous breakdowns, bodily discomfort, or dissatisfaction with one's circumstances.^[11] In haptotherapy, insightful conversations are employed to patients about their emotional experiences. Bodily tension is addressed and the manifestation of emotions in physical movements is explored. Moreover, preferred postures and movements are crafted to enhance well-being. Skill-building exercises, and therapeutic touch (actual contact) are also utilized. This approach focuses on enhancing the mother's awareness of her bodily experiences during pregnancy and childbirth, enabling her to perceive pregnancy and childbirth as a positive event.^[12] Incorporating emotional touch and skills can transform the insights gained from cognitive-based therapeutic conversations

into a profoundly felt experience with enduring effects. Haptotherapy has the potential to serve as an independent and intervening treatment for pregnant individuals. This method was first utilized for pregnancy in 1993 to reduce maternal fear of childbirth.^[13] The increased Maternal-fetal attachment and the mother's ability to overcome pregnancy-related stress were proposed as the secondary benefits of this approach.^[14] Furthermore, additional research has demonstrated the efficacy of haptotherapy in enhancing maternal-fetal attachment^[10,15-17]. Therefore, it can be suggested as one of the beneficial strategies for improving maternal-fetal attachment. One of the techniques employed in haptotherapy is emotional touch. According to the existing evidence, the practice of pregnant women using abdominal palpation to detect fetal organs or enhance their awareness of fetal movements has yielded varying outcomes. Some studies have indicated that this approach has proven effective in elevating maternal attachment scores to the fetus in planned pregnancies^[18-20]. According to other studies, including Carson and Virden's research, no significant correlation was observed between abdominal palpation and massage and improvement in maternal attachment behaviors.^[21]

Moreover, research highlights crucial factors impacting maternal-fetal attachment and well-being of the fetus. Late prenatal care and neglecting preconception care may increase the possibility of the adverse consequences of the unplanned pregnancies. Insufficient maternal-fetal attachment further exacerbates challenges, leading to irregular clinic visits or non-adherence to medical recommendations.^[22] Given the importance of enhancing maternal-fetal attachment in unplanned pregnancies, it appears imperative to develop and execute interventions aimed at mitigating adverse pregnancy outcomes. In light of the practical applicability of haptotherapy methods for pregnant mothers, the present study seeks to examine the impact of haptotherapy on maternal-fetal attachment in unplanned pregnancies; haptotherapy entails the act of touching and verbal communication to the unborn child, drawing on the mother's abdomen, sketching a schematic of the fetus, and focusing on the developmental stages of the fetus during pregnancy.

Materials and Methods

Study design and setting

The current study is a field trial conducted from August to November 2022 at comprehensive health centers in Isfahan.

Study participants and sampling

Eligible participants were selected from 8 health centers in Isfahan using convenient sampling method. Inclusion criteria were as follows: being between 20 to 24 weeks of gestation, having literacy in reading and writing,

experiencing no maternal complications leading to hospitalization, having no severe mental illnesses or disorders (based on maternal health records), singleton pregnancy, no history of substance abuse, having no life traumas in the past six months, no fetal abnormalities detected through ultrasounds up to 20 weeks of gestation, having access to online social network, and neither the pregnant mother nor her husband having educational background in psychology, medicine and midwifery. Instances of refusal to continue with the study, hospitalization due to complications, being absent at any of the training sessions, severe psychological problems or highly stressful events during the study, and failure to complete attachment exercises for one week resulted in the participants being excluded from the study. In order to ensure that the exercises were completed by the participants, they were provided with a checklist. They were then instructed to mark off the completed exercises on the checklist and submit a photo of it to the researcher at the end of each week. The sample size considering the confidence coefficient of 95% is equal to 1.96, test's power at 80% is calculated to be 0.84, and the minimum difference in the average attachment scores between the two groups, indicating a significant difference, was calculated as 7.0, with a 10% dropout rate for each group of 33 individuals.

Data collection method and tools

The instruments utilized for data collection included demographic and fertility questionnaires, along with the Cranley's maternal-fetal attachment questionnaire. The demographic and fertility questionnaire consisted of age of parents, mother's education, mother's occupation, marital satisfaction, economic status, and housing condition. In addition, pregnancy-related questions included the gravidity and parity, number of abortions, and number of miscarriages dead children. The Cranley's maternal-fetal attachment questionnaire comprises 24 statements, each requiring the mother to indicate her level of agreement on a scale of 1 (no) to 5 (definitely yes). The total score ranges from 24 to 120, with a higher score indicating a more robust maternal-fetal attachment. The validity of the Persian version of the Cranley questionnaire has been assessed and confirmed by Khoramroodi using the content validity method and its reliability through the test-retest method.^[23]

At the time of referral for perinatal care, the study participants underwent evaluation and were subsequently invited to participate if they met the specified criteria. Data collection was conducted through convenience sampling method, then participants were randomly allocated to either the experimental or control groups. The participants were assigned to either the experimental or control group using the given cards with a number on it. A draw was conducted to determine

whether the experimental group would be based on even or odd numbers. After thoroughly explaining the study's methodology and obtaining participants' consent, the experimental and control groups completed a self-reported demographic and maternal-fetal attachment questionnaires at the 24th week of pregnancy.

The experimental group engaged in an in-person educational program in small groups of 3 to 5 individuals in three sessions. The three in-person sessions took place during 24-28 week, 28-32 week and 32-34 week of pregnancy. Subsequently, they proceeded to carry out the prescribed activities at home based on the instructions. Focusing on maternal interaction and communication with the fetus, the initial in-person educational session that was conducted between weeks 24-28 of pregnancy, guided mothers to engage in conversation with the fetus and counting its movements. Mothers were required to talk to their fetus three times a week in a regular daily routine while counting the baby's movements simultaneously. In the second in-person session, between weeks 28-32 of pregnancy, mothers were shown a three-dimensional video of a developing fetus relevant to their specific gestational age. Then, they held a discussion and exchange of perspectives on the developmental progress of the fetus. Moreover, during this timeframe, weekly photos of the fetus's development corresponding to the gestational age, along with explanations, were sent via online messengers to augment the expectant mother's understanding of her fetal growth. During the third in-person educational session which occurred between 32-34 weeks of pregnancy, the importance of emotional palpation was emphasized. In this session, initially, mothers were asked to speculate about the position of the fetus in their womb, and then the researcher performed the first and second Leopold maneuvers with the help of the mother's hand, accompanied by a simple explanation of these maneuvers. Based on the Leopold maneuver, a schematic representation of the fetus's positioning within the womb was depicted using non-toxic finger painting on the mother's belly. The control group only received routine parental care, and after the treatment at the end of the 34th week of pregnancy, both the control and experimental groups once more completed the Cranley's questionnaire via self-reporting.

The data were analyzed using SPSS version 16 software (StataCorp LLC, College Station, Texas, USA), and statistical tests, including T-test, Mann-Whitney U test, and Chi-square were conducted at a significance level of 0.05.

Ethical considerations

The present study is part of a master's thesis in midwifery, and the procedures have been approved by the Research Ethics Committee of Isfahan University of Medical

Sciences (Code: IR.MUI.NUREMA.REC.1401.052). Participants were informed about the confidentiality of their information and their right to withdraw from the study; in addition, an informed consent was obtained from all participants in the study to assure the researcher that the participants know every aspect of their participation. It's worth noting that the research posed no risks to the participants.

Result

In this research, 66 mothers with unplanned pregnancies who sought assistance at comprehensive healthcare facilities in Isfahan were included as participants in the present study.

The mean (SD) age of mothers in the intervention group was 32.24 (5.24), while in the control group it was 31.76 (5.04). The mean (SD) age of the husbands in the intervention and control groups was 36.55 (5.53) and 35.48 (5.6), respectively. There was no significant difference in the average age of mothers ($=0.38$, $P = 0.37$) and husbands ($=0.76$, $P = 0.44$) between the experimental and control groups.

The majority of mothers in both the experimental group (48.5%) and the control group (60.6%) possessed a university education. Most mothers in the two groups were housewives. There were no statistically significant differences between the two groups regarding education, occupation, economic status, housing condition, and marital satisfaction [Table 1]. The mean (SD) gestational age within the experimental and control groups was 22.8 (1.18) and 22.48 (1.48) weeks, respectively. Fertility characteristics of mothers between the experimental and control groups in terms of gestational age ($P = 0.469$), number of pregnancies ($P = 0.576$), number of abortions ($P = 0.083$), number of live children ($P = 0.169$), number of dead children ($P = 0.079$), and the number of deliveries ($P = 0.244$) did not exhibit statistically significant differences.

There was no significant disparity in the average scores of maternal-fetal attachment between the experimental and control groups before the intervention. However, after the intervention, there was a difference in the mean attachment scores between the two groups [Table 2]. After the intervention, the mean score of the experimental group exhibited a significant increase compared to the pre-intervention ($t=-9.20$, $P < 0.001$). Conversely, no substantial difference was noted in the control group.

Discussion

The current research tried to assess the effects of specific hypnotherapy techniques on maternal-fetal attachment

in unplanned pregnancies. The results revealed a notable disparity in the mean maternal-fetal attachment scores following the intervention between the experimental and control groups. The techniques employed in the study encompassed guided imagery, skill-building exercises, and therapeutic belly touching. These methods facilitate communication and connection, which are core principles in interventions rooted in haptotherapy. In this approach, pregnant mothers were taught to establish a connection with the surrounding world and the fetus in their womb through tactile interaction. Additionally, touching the abdomen and focusing on the fetus enhances mothers' awareness of the presence of another living human being inside them and prepares them for motherhood.^[24]

The interventions employed in the present study focused on exercises related to communicating with the fetus and cultivating a mental image. Visualizing the fetus and engaging the mother's mind with the physical characteristics of the fetus through activities such as watching films and pictures, touching the fetus, drawing the fetus, drawing its schematic form on the belly, and developing a mental image were aimed at enhancing the mother's visualization of the fetus, making the fetus' identity more tangible, and enhancing attachment through stimulating emotions and passion.^[10] One highlighted aspect of haptotherapy involves modifying cognitive patterns to help pregnant women recognize their ability to accept and experience a range of emotions. During this phase, attempts are made to awaken the mother's feelings and recognition of the living human being inside her. In this regard, a dialogue occurs between the researcher and the mother, aiming to strengthen the mother's motivation to express her feelings, which ultimately leads to a gradual shift in the mother's perception and mindset regarding her unplanned pregnancy. During the implementation of this intervention, pregnant mothers are instructed to focus solely on their fetus and refrain from paying attention to others while simultaneously touching their abdomen.^[24] In fact, the utilization of this technique encompasses the practical concepts in haptonomy, which reinforces the pregnant mother's connection with her fetus and her maternal identity. The possible mechanism for enhancing maternal-fetal attachment among mothers who have received training in haptotherapy techniques may be attributed to the intervention's secondary benefits in decreasing maternal anxiety levels. In the field of haptotherapy, which is essentially the therapeutic application of the principles of haptonomy, one could mitigate the adverse impacts of fear and stress through safe touch. By employing relaxation and stress alleviation principles, haptotherapy eases maternal relaxation and diminishes stress levels.^[25] Based on available evidence, it is evident that maternal anxiety is more prevalent in unplanned pregnancies.^[26]

Table 1: Comparison demographic variables between experimental and control groups

| Variable | Control Group | | Experimental Group | | Test Statistics | P |
|----------------------|---------------|---------|--------------------|---------|-----------------|--------------------|
| | Number | Percent | Number | Percent | | |
| Mother's Education | | | | | | |
| High School | 2 | 6.1 | 2 | 6.1 | 1.060 | 0.589 ^a |
| Diploma | 11 | 33.3 | 15 | 45.5 | | |
| University | 20 | 60.6 | 16 | 48.5 | | |
| Total | 33 | 100.0 | 33 | 100.0 | | |
| Mother's Occupation | | | | | | |
| Housekeeper | 25 | 75.8 | 29 | 87.9 | --- | 0.446 ^b |
| Manual Worker | 5 | 15.2 | 3 | 9.1 | | |
| Employee | 3 | 9.1 | 1 | 3.0 | | |
| Total | 33 | 100.0 | 33 | 100.0 | | |
| Economic Status | | | | | | |
| Low | 0 | 0.0 | 1 | 3.0 | --- | 1.000 ^b |
| Middle | 15 | 45.5 | 16 | 48.5 | | |
| High | 17 | 51.5 | 16 | 48.5 | | |
| Very High | 1 | 3.0 | 0 | 0.0 | | |
| Total | 33 | 100.0 | 33 | 100.0 | | |
| Housing Condition | | | | | | |
| Rental | 18 | 54.5 | 17 | 51.5 | 0.061 | 0.805 ^a |
| Owning a house | 15 | 45.5 | 16 | 48.5 | | |
| Total | 33 | 100.0 | 33 | 100.0 | | |
| Marital Satisfaction | | | | | | |
| Much | 25 | 75.8 | 22 | 66.7 | 0.665 | 0.415 ^a |
| Medium | 8 | 24.2 | 11 | 33.3 | | |
| Total | 33 | 100.0 | 33 | 100.0 | | |

P-value is calculated based on ^aChi-square ^bFisher's exact test

Table 2: Comparison of the mean scores of maternal-fetal attachment before and after the intervention between the experimental and control

| Variable | Measurement time | Mean±SD | | t-Test | P |
|---------------------------|------------------------|----------------|---------------------|--------|---------|
| | | Control Groups | Experimental Groups | | |
| Maternal-Fetal Attachment | Before intervention | 92.24±10.20 | 87.39±10.01 | -1/94 | 0/56 |
| | After the intervention | 91.33±9.60 | 100.91±6.46 | 4/75 | 0<0/001 |

One of the techniques taught to mothers during the intervention was to emotionally connect with the fetus through touching their bellies. Mothers were instructed to perform this technique regularly, as persistence in performing and repeating the techniques is a fundamental principle of haptotherapy. This continuity allows the mother to direct her emotions toward the fetus and to refrain from engaging in negative emotions, fears, and undesirable emotional reactions.^[24] Although there is a scarcity of research on the influence of haptotherapy on maternal-fetal attachment, various studies have extensively investigated conventional methods in haptotherapy. For example, Kordi *et al.* (2016) conducted a study to examine the effects of guided mental imagery on the development of maternal-fetal attachment in primiparous women experiencing unplanned pregnancies. The result indicated a significant increase in attachment scores within the experimental group.^[26] In their study, Tousi *et al.* (2011) utilized various methods such as abdominal touching, fetal recognition, counting and recording fetal movement, positive visualization of

fetal appearance, and envisioning holding and nursing the infant. These approaches led to heightened maternal attachment in first-time and planned-pregnancy mothers.^[18]

It appears that one of the critical determinants of the effectiveness of employed methods is the duration of the intervention. For example, in Davachi *et al.*'s (2000) study, the intervention involving fetal touch over a shorter period (4 weeks) did not result in a significant improvement in maternal-fetal attachment.^[27] Furthermore, it is crucial to take into account variations in counseling approaches, educational methods, intervention duration, and time of initiating intervention during pregnancy when interpreting study findings.^[28] Consequently, the current study suggests that commencing intervention early in the second trimester of pregnancy and maintaining them for an extended period have proven to be effective in enhancing attachment.

Psychological interventions are considered one of the foundations of haptotherapy.^[15] Some related

studies have solely utilized psychological approaches to enhance maternal-fetal attachment. For instance, Hoseini *et al.* (2019) reported improvement in maternal-fetal attachment in women with unplanned pregnancies through an intervention using a cognitive-behavioral counseling approach.^[29]

This study represents the first investigation into the impact of haptotherapy on maternal-fetal attachment in unplanned pregnancies in Iran. It may serve as a starting point for future research, targeting diverse groups of pregnant mothers. However, a small sample size and individual psychological variables that may affect maternal-fetal attachment are the limitations of the present study. Based on this, it is suggested to conduct studies with a larger number of participants and to consider individual psychological characteristics.

Conclusion

Findings suggest that the use of haptotherapy as an innovative and secure approach to enhance maternal-fetal attachment in mothers with unplanned pregnancies who are at risk of developing weak or undesirable attachments is considered a promising intervention; that is, this intervention is suggested to be beneficial in maternal health care services for reducing the possible complications of such pregnancies.

Acknowledgments

We are grateful to Isfahan University of Medical Sciences for reviewing and approving the research plan (code: IR.MUI.RESEARCH.REC.1400.156) and funding the research. We also thank the participants for their cooperation during the research.

Financial support and sponsorship

The study was supported by a grant from the Isfahan University of Medical Sciences.

Conflicts of interest

There are no conflicts of interest.

References

- Wilson L, Peters TW. *The Attachment Pregnancy: The Ultimate Guide to Bonding with Your Baby*. Simon and Schuster; 2013.
- Abbaszadeh M, Saadati Kasbogar H. Domestic violence, a threat to mental health (Sociological study of married women in Tabriz city). *Social Security Studies Journal* 2010;24:61-90. [In Persian]
- Neff KD, Pisitsungkagarn K, Hsieh YP. Self-compassion and self-construal in the United States, Thailand, and Taiwan. *J Cross Cult Psychol* 2008;39:267-85.
- Magee SR, Bublitz MH, Orazine C, Brush B, Salisbury A, Niaura R, *et al.* The relationship between maternal–fetal attachment and cigarette smoking over pregnancy. *Matern Child Health J* 2014;18:1017-22.
- Sandbrook S. Love or protection? Defining and measuring maternal-fetal attachment from the woman's perspective. Thesis. University of Wolverhampton; 2009. <http://hdl.handle.net/2436/90893>.
- Jamshidimanesh M, Astaraki L, Behboodi Moghadam Z, Taghizadeh Z, Haghani H. Maternal-fetal attachment and its associated factors. *Hayat* 2012;18:33-45.
- Pakseresht S, Rasekh P, Leili EK. Physical health and maternal-fetal attachment among women: Planned versus unplanned pregnancy. *Int J Womens Health Reprod Sci* 2018;6:335-41.
- Bahk J, Yun SC, Kim YM, Khang YH. Impact of unintended pregnancy on maternal mental health: A causal analysis using follow up data of the Panel Study on Korean Children (PSKC). *BMC Pregnancy Childbirth* 2015;15:1-12. doi: 10.1186/s12884-015-0505-4.
- Abasi E, Keramat A, Borghei NS, Goli S, Farjamfar M. Evaluating the effect of prenatal interventions on maternal–foetal attachment: A systematic review and meta-analysis. *Nursing Open* 2021;8:4-16.
- Klabbers GA, Paarlberg KM, Vingerhoets A. Does haptotherapy benefit mother-child bonding in women with high fear of childbirth. *Int J Haptonomy Haptother* 2018;3:1-7.
- The Association of Haptotherapists. How does haptotherapy help? 2022. Available from: <https://www.haptotherapeuten-vvh.nl/haptotherapie/overzicht>. [Last accessed on 10 January 2023].
- Klabbers GA, Vingerhoets A. What is the effect of haptotherapy on patients with chronic pain. *Int J Haptonomy Haptother* 2021;1:1-9.
- Klabbers G. Can haptotherapy reduce fear of childbirth? Some first answers from a randomized controlled trial. Thesis 2018. Available from: <https://research.tilburguniversity.edu/en/publications/can-haptotherapy-reduce-fear-of-childbirth-some-first-answers-fro>.
- Klabbers GA, Wijma K, Paarlberg KM, Emons WHM, Vingerhoets AJJM. Haptotherapy as a new intervention for treating fear of childbirth: A randomized controlled trial. *J Psychosom Obstet Gynecol* 2019;40:38-47.
- Klabbers GA, Wijma K, Paarlberg KM, Emons WH, Vingerhoets AJ. Treatment of severe fear of childbirth with haptotherapy: Design of a multicenter randomized controlled trial. *BMC Complement Altern Med* 2014;14:1-10.
- Ozbek H, Pinar SE. The effect of haptonomy applied to pregnant women on perceived stress, fear of childbirth, and prenatal attachment: Randomized controlled experimental study. *Curr Psychol* 2023;42:23313-22.
- Dorosti E, Nourizadeh R, Mehrabi E, Herizchi S. The effect of haptonomy intervention on fear of childbirth and maternal-fetal attachment among primigravid women. *Curr Womens Health Rev* 2023;19:39-47.
- Toosi M, Akbarzadeh M, Zare N, Sharif F. Comparison of the effects of attachment behavior and relaxation training on maternal fetal attachment and infant in prime pregnant women. *J Fundamentals Ment Health* 2014;16:142-9.
- Toosi M, Akbarzadeh M, Zare N, Sharif F. Effect of attachment training on anxiety and attachment behaviors of first-time mothers. *HAYAT*. 2011; 17 (3): 69-79.
- Fowles ER. *The Relationship Between Prenatal Maternal Attachment, Postpartum Depressive Symptoms and Maternal Role Attainment*. Loyola University Chicago; Illinois, Chicago, 1994.
- Carson K, Virden S. Can prenatal teaching promote maternal attachment? Practicing nurses test Carter-Jessop's prenatal attachment intervention. *Health Care Women Int* 1984; 5:5-6, 355-369, DOI: 10.1080/07399338409515666.
- Abame DE, Abera M, Tesfay A, Yohannes Y, Ermias D, Markos T, *et al.* Relationship between unintended pregnancy and antenatal care use during pregnancy in Hadiya Zone, Southern Ethiopia. *J Reprod Infertil* 2019;20:42-51.

23. Cranley MS. Development of a tool for the measurement of maternal attachment during pregnancy. *Nurs Res* 1981;30:281-4.
24. Demir R. An innovative intervention method in the treatment of fear of birth: Haptotherapy. *Psikiyatride Güncel Yaklaşımlar-Current Approaches in Psychiatry*. 2022;14:316-21.
25. Pachtman Shetty SL, Fogarty S. Massage during pregnancy and postpartum. *Clin Obstet Gynecol* 2021;64:648-60.
26. Kordi M, Fasanghari M, Asgharipour N, Esmaily H. Effect of guided imagery on maternal fetal attachment in nulliparous women with unplanned pregnancy. *J Midwifery Reprod Health* 2016;4:723-31.
27. Davachi A, Khoramroodi R, Shahpoorian F, Haghani H. Fetal touching! does it improve maternal fetal, or maternal newborn attachment? *Iran J Nurs* 2000;13:16-24.
28. Coleman PK. Maternal-fetal attachment. 51 st session on the status of women, United Nations, 2007. Available from: <https://www.wecareexperts.org/content/coleman-p-k-march-2007-maternal-fetal-attachment-51st-session-status-women-united-nations>.
29. Hoseini S, Motaghi Z, Nazari AM, Goli S. Evaluation of effectiveness midwifery counseling with cognitive-behavioral approach to maternal-fetal attachment in pregnant women with unwanted pregnancy. *Avicenna J Clin Med* 2020;27:85-93.