



The effect of haptonomy applied to pregnant women on perceived stress, fear of childbirth, and prenatal attachment: randomized controlled experimental study

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Accepted: 21 June 2022 / Published online: 16 July 2022

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Abstract

This study was conducted to determine the effect of haptonomy applied to pregnant women on perceived stress, fear of childbirth, and prenatal attachment. The population of the randomized controlled experimental study consisted of 72 primiparous pregnant women within the gestational weeks 22–28 who presented to the Obstetrics and Gynecology Polyclinic of a state hospital in Turkey for check-up (36 experimental subjects, 36 control subjects). A home visit was made to the experimental group, and haptonomy was applied for at least 30 min, once a week, for 7 weeks (with the researcher for 3 weeks, with the husband by providing the training brochure and video that will help the practice for the next 4 weeks). The control group did not receive any treatment. After the haptonomy application, the stress levels and fears of childbirth of the pregnant women in the experimental group decreased, and their attachment levels with their babies increased.

Keywords Fear of Childbirth · Haptonomy · Perceived stress · Prenatal attachment

Introduction

Stress during pregnancy and fear of childbirth can cause complications before and after birth (Klabbers, 2018; Larsen et al., 2017), negatively affect brain development of the newborn, increase the use of analgesia during birth, prolong birth process, increase the risk of interventional delivery and emergency cesarean section (Hermon et al., 2019; Stojanow et al., 2017). Moreover, stress during pregnancy and fear of childbirth can increase obstetric problems including preeclampsia, preterm labor, posttraumatic stress disorder, postpartum anxiety, depression and psychosis, and even increase the need for psychiatric care (Arfaie et al., 2017; Dencker et al., 2019; Veringa et al., 2016). These problems

cause attachment problems in mother and infant, which is the determinant of mother-infant relationship (Hobek Akarsu et al., 2017). Mother-infant attachment, negatively affected by mental problems such as stress, anxiety, depression, and fear of childbirth during pregnancy, can also negatively affect the attachment process in postnatal period (Hermon et al., 2019).

It has been supported by some studies in the literature that mental disorders during pregnancy reduce mother-infant attachment (Dayton et al., 2019; Dereli Yılmaz & Kizilkaya Beji, 2013). There are some non-pharmacological applications aiming to strengthen the mother's mental well-being, reduce stress and fear of childbirth, and strengthen the attachment between mother and infant. These are the practices including yoga, listening to music, lamaze, cognitive and behavioral therapies, hypnosis and haptonomy (Hobek Akarsu & Rathfisch, 2018; Ucar & Golbasi, 2019). Haptonomy is one of the applications and a new research area, stated to increase prenatal attachment by reducing stress and fear of childbirth during pregnancy, but which has not been adequately supported by research (Adam, 2012; Klabbers, 2018; Klabbers et al., 2017).

Haptonomy, as a field dealing with emotional contact through touch, describe the relationship between parents and

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unborn baby (Ksycinski et al., 2010). Concurrently, mother's adaptation to pregnancy and psychological preparation for birth are also provided with this application (Fernández Fernández-Arroyo, 2020). A limited number of studies have shown that haptonomy can reduce fear of childbirth (Klabbers, 2018; Klabbers et al., 2014), protect from maternal depression (Adam, 2012), and increase prenatal attachment (Klabbers et al., 2018). Furthermore, a smooth pregnancy and childbirth, and strengthening the relationship between spouses and bond of marriage can be listed among the benefits of haptonomy (Adam, 2012). When the national and international literature is reviewed, it is stated that although the benefits of haptonomy are specified, there aren't enough scientific studies (Arabin & Metz, 2020; Kemper, 2017).

It is thought that haptonomy will have a positive effect on mother and infant health by contributing to increase of psychological well-being of women during pregnancy, childbirth and postpartum period and to prevent mental disorders. By reducing the mental problems that the pregnant may experience and ultimately strengthening mother-infant attachment, physical and mental problems that may be experienced in both mother and infant during pregnancy, during childbirth, and in the postpartum period can be minimized. Moreover, the findings obtained as a result of this research can guide midwives, one of the important health professionals, in creating a care plan and increasing mental health of pregnant women. Haptonomy can be used by midwives in approaches to pregnant women and can be one of the basic practices of midwifery care that will support healthy pregnancy process. It is thought that the obtained findings will contribute to the literature. Although there are some limited studies in international literature on haptonomy applied to pregnant women (Adams et al., 2012; Klabbers, 2018; Klabbers et al., 2014), there haven't been any studies about perceived stress, fear of childbirth, prenatal attachment, and haptonomy used in pregnant women at the national level. In this study, it was aimed to examine the effect of haptonomy applied to pregnant women on perceived stress, fear of childbirth, and prenatal attachment.

Research Hypotheses

H₁ It reduces perceived stress in pregnant women treated with haptonomy compared to those not treated.

H₂ It reduces the fear of childbirth in pregnant women treated with haptonomy than in those who are not treated.

H₃ It increases prenatal bonding in pregnant women treated with haptonomy compared to those who are not treated.

H₄ There is a difference between the perceived stress of the haptonomy group before and after haptonomy.

H₅ There is a difference between the anxiety level of the haptonomy group before and after haptonomy.

H₆ There is a difference between the prenatal attachment level of the haptonomy group before and after haptonomy.

Methods

Study design

The research was conducted as a randomized controlled experiment. Population of the study contained pregnant women who applied to the Obstetrics and Gynecology Polyclinic of a state hospital in the Central Anatolia Region of Turkey for control, and the application of the research was carried out between 10.09.2020 and 10.06.2021. This trial was registered on Clinicaltrials.gov, registration number NCT05240092.

Participants

Inclusion criteria of the study.

- primiparous pregnant women who were married,
- aged ≥ 18 years,
- literate,
- living in city center,
- not having any health problems in themselves and their infants,
- with spontaneous pregnancy at 22–28 weeks of gestation,
- without perception and communication problems,

and who agreed to participate were included. The literature reports that prenatal anxiety and fears are higher than multiple pregnancies and that the number of pregnancies affects prenatal attachment (Koc Ozkan et al., 2020; Korukcu, 2009; Sis Celik and Atasever, 2020). Considering the literature, primiparous women were selected for the study.

Pregnant women meeting the inclusion criteria were randomly assigned to the groups according to the order of arrival to the outpatient clinic (1 experiment, 1 control). A

total of 107 pregnant women were included in the study, but 20 pregnant women from experimental group and 15 from control group were excluded because they or their spouses had positive COVID-19 PCR tests or did not accept home visits in the next period. The study was completed with 72 pregnant women (experimental: 36; control: 36) (Fig. 1).

Sample of the study was calculated by performing power analysis with G power program (Faul et al., 2009) and by reference to previous studies (Hobek Akarsu & Rathfisch, 2018). According to the power analysis, the minimum sample size was calculated as 68 people (34 experiment, 34 control) to reach a power of 0.81 with an effect size of 0.70 and a margin of error of 5%. Considering possible data losses, 72 people (36 experiments, 36 controls) were included in the study. According to posthoc power analysis, a power of 0.83 was achieved with an effect size of 0.70 and a margin of error of 5%.

Data collection tools

Pregnancy description form

In the form created by the researcher, there were 20 questions, including 13 questions examining socio-demographic characteristics of pregnant women such as age, education, occupation, income status, and 7 questions including obstetric history such as desired pregnancy status, whether it was planned or not, and pregnancy follow-ups (Dencker et al., 2019; Hobek Akarsu & Rathfisch, 2018; Tison, 2019).

Perceived stress scale (PSS)

The scale was developed by Cohen et al., (1983) and adapted to Turkish society after a validity and reliability study by Erci (2006). The scale consists of 10 items, each item receives 1,2,3,4,5 points in turn and is evaluated over total score. The scale is used to reliably determine a person's stress level. Total score ranges from 10 to 50, and an increase in the score indicates an increase in perceived stress level. Cronbach's Alpha internal consistency coefficient of the scale was 0.79 in the validity and reliability study (Erci, 2006). In our study, total Cronbach's Alpha value of the scale was 0.82 at the first follow-up, 0.79 at the second follow-up, and 0.78 at the third follow-up.

Wijma delivery expectancy/experience questionnaire version A (W-DEQ-A)

The scale, developed by Wijma et al., (1998) to determine the level of birth fear experienced by pregnant women, was adapted into Turkish by Korukcu (2009). W-DEQ version A is a 33-item scale. Answers in the scale are numbered from

0 to 5 and are in a six-point Likert type. The minimum score that can be obtained from the scale is 0, and the maximum score is 165. A high total score indicates a high level of fear. Cronbach's Alpha value of the scale was 0.89 in the validity and reliability study (Korukcu, 2009). In our study, Cronbach's Alpha value of the scale was 0.93, 0.92 and 0.95 at the first, second and third follow-ups, respectively.

Prenatal attachment inventory (PAI)

PAI, developed by Muller (1993), is used to explain thoughts, feelings, and situations experienced by woman during pregnancy and to determine the level of attachment to infant in prenatal period (Muller, 1993). Turkish validity and reliability study of the inventory was carried out by Dereli Yilmaz & Kizilkaya Beji (2013), and consists of 21 items. Each item is of a four-point Likert type, with a score between 1 and 4. A minimum score of 21 and a maximum score of 84 can be obtained from the scale. Increase in the score obtained by pregnant indicates that level of attachment also increases. Cronbach's Alpha value was 0.84 in validity and reliability study of the inventory,¹⁰ and 0.89, 0.90 and 0.92 at the first, second and third follow-ups in this study, respectively.

Video tutorial

Seven minute haptonomy training video was shot on the model by the researcher to guide pregnant women during the practice of haptonomy at home with their spouses. Video content includes definition of haptonomy, its benefits, characteristics of the environment in which haptonomy will be applied, stages of haptonomy, and information to be considered in practice, accompanied by music where expert opinion (Rathfisch, 2019) is taken (same music was used for each pregnant woman to ensure standard practice). Video was shot in accordance with the literature (Adam, 2012; Vinit, 2010), and then expert opinion was obtained (Rathfisch, 2019).

Education brochure

It is a brochure containing definition, benefits, and stages of haptonomy aiming to guide the pregnant women in the application of haptonomy before the research (CIRDH, 2018a, 2018b; Rathfisch, 2019).

Procedure

Data collection from the experimental group

Pregnant women who applied to the outpatient clinic, met the research criteria and agreed to participate in the study

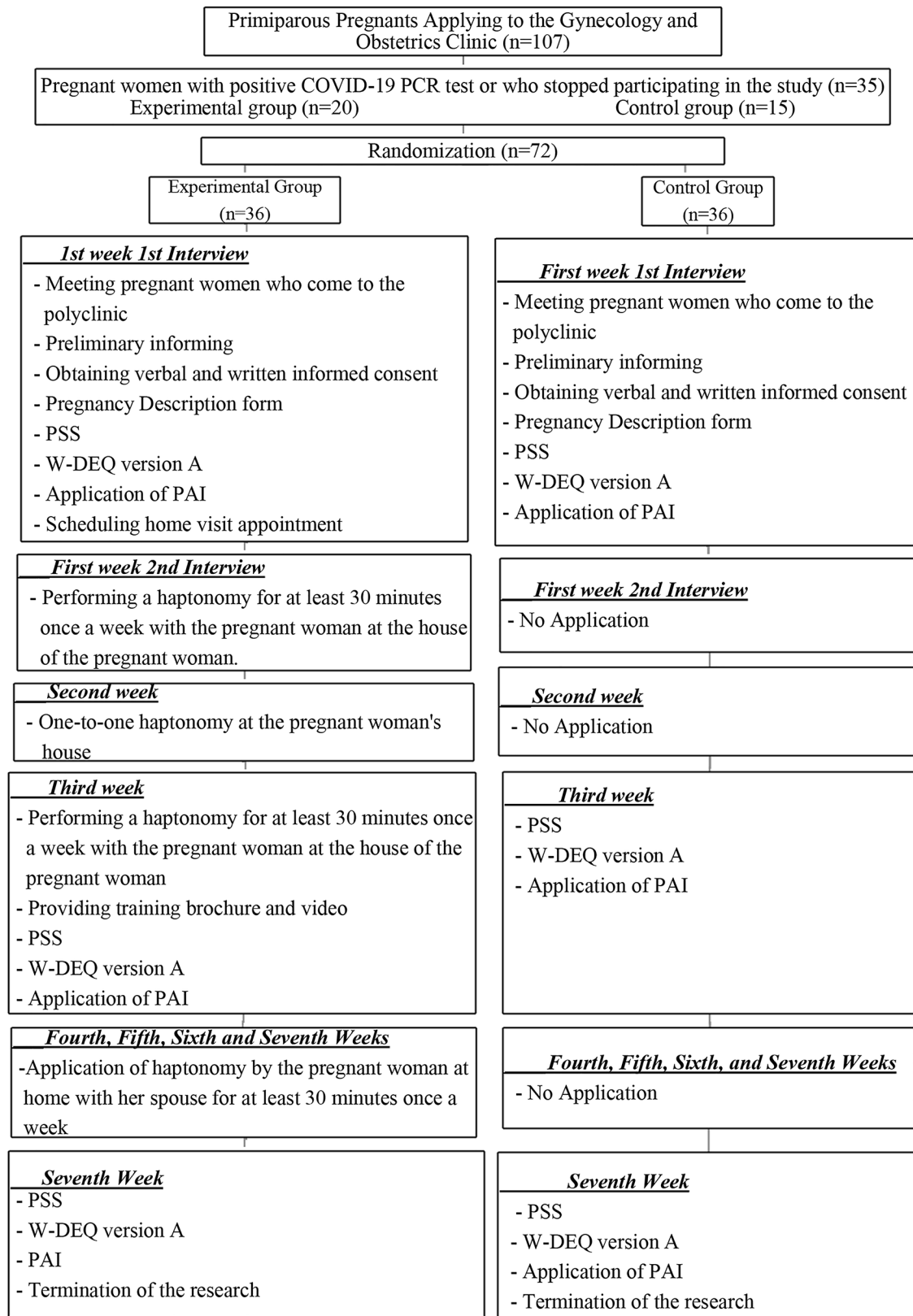


Fig. 1 Flow Chart of Research Practice

were informed about the research in a quiet, calm and private room. After obtaining written and verbal informed consents, Pregnancy Description form, PSS, W-DEQ version A and PAI were applied (first follow-up). In the first interview, data were collected by the researcher by face-to-face interview technique. To protect the pregnant woman and the researcher, a face-to-face interview was conducted to minimize contact in the hospital environment during the pandemic COVID – 19. Filling the forms took 15–20 min. Then, pregnant women included in the experimental group were called before each home visit so that haptonomy could be done at home, and appointment planning was made.

All home visits, including haptonomy, lasted 60–90 min. Three applications of the sessions were applied one-on-one with the pregnant woman, and after the third application, PSS, W-DEQ version A and PAI were applied by the researcher (second follow-up). Afterwards, training brochure prepared by the researcher and training video shot on the model were given to the pregnant woman, and she did the last 4 applications with her spouse at home as shown by the researcher. After performing the application every week with her spouse, the pregnant woman gave feedback on what she did via WhatsApp. Due to the COVID – 19 pandemic, the third follow-up was conducted via Whatsapp. In the seventh week, PSS, W-DEQ version A and PAI were reapplied via WhatsApp. The forms were sent to the pregnant women as screenshots or as Word files over the phone so that they could tick the questions. After completing the forms, they were asked to send them via Whatsapp in the same format (third follow-up) (Fig. 1).

Application of haptonomy

Haptonomy was performed by individual home visits to pregnant women. At the beginning of home visit, information was given about definition, purpose, and importance of haptonomy. It has been informed that haptonomy will be applied once a week for at least 30 min on the day and time they want for 7 weeks, for the first 3 weeks, with the researcher, and for the next 4 weeks, with the help of the haptonomy training brochure and video. The pregnant woman's questions were answered, and the environment for haptonomy was prepared (a calm, quiet room was chosen, cushions were placed on the floor opposite to each other, back of the pregnant woman was supported so that she could be comfortable). The environment was prepared in the same way for each application. Stages of application:

1. For the application, a face to face sitting position was taken.
2. In order to be used as a standard throughout the research, a piece of music was started to be played, after which expert opinion was taken (Rathfisch, 2019).
3. The application was made with the eyes of the pregnant woman closed.
4. The practice started with breathing exercises. With abdominal and chest breathing, the body was relaxed.
5. Energy work and dreaming phase was started. The researcher and pregnant woman put their left hands on each other's hearts. The goal is to feel the energy, feel the heart, open the third eye and prepare the hands (Adam, 2012; Rathfisch, 2015, 2019). In this study, it was aimed to increase the confidence of the pregnant woman in her own feelings and body by getting to know her feelings and body. Then, the researcher and pregnant woman placed their right hands on their foreheads while their left hands were on their hearts. Thus, it was ensured the pregnant woman visually felt the presence of the baby. It was ensured that her communication with her baby is in spiritual dimension as well as the physical dimension (Adam, 2012; Klabbers, 2018; Rathfisch, 2019).
6. Then, the stage of touching and communicating with the baby was initiated. Hands of the researcher and pregnant woman were placed on the pregnant woman's womb. Thus, it was ensured that the baby could recognize the warmth and energy of the pregnant woman's hands. Then, the first call of the pregnant woman to her baby was provided. The aim is to enable the baby to recognize the mother's voice. This call to the baby was repeated 2–3 times.
7. By touching the womb of the pregnant woman with her, exercises to adapt to the fetus were applied. The aim is to increase awareness of pregnant woman's feelings and to enable her to play intrauterine games with her baby (such as calling out to the baby, shaking her abdomen, and making the baby move to the touched area with the mother's voice). Thus, she was supported to carry and communicate with her baby with love, and encouraged. With touching, mother's reactions to the baby and baby's reactions to the mother were followed. In this way, the bond between pregnant woman and baby was strengthened, helping the mother to recognize baby's movements and her own feelings.
8. Haptonomy was terminated with breathing exercise (Adam, 2012; Célestin-Lhopiteau & Wanquet-Thibault, 2018; Klabbers, 2018; Paica, 2017; Rathfisch, 2019).

Data collection from the control group

Pregnant women who presented to outpatient clinic, met the research criteria, and agreed to participate were informed

about the study. This interview was held with the pregnant woman in a quiet, calm, and private room in the polyclinic. After obtaining written and verbal informed consents, Pregnancy Description form, PSS, W-DEQ version A and PAI were applied (first follow-up). In the first interview, data were collected by the researcher by face-to-face interview technique. Filling the forms took 15–20 min. Then, phone numbers of the pregnant women were taken, and PSS, W-DEQ version A and PAI were applied via WhatsApp on the third week (second follow-up) and the seventh week (third follow-up). The forms were sent to the pregnant women as screenshots or as Word files via telephone so that they could tick the questions. After filling out the forms, they were asked to send them via Whatsapp in the same format (Fig. 1).

Ethical considerations

Ethics Committee approval for Non-Interventional Clinical Research (decision no: 2020-01/21) and written permission (no: 112571053) from the institution where the study was conducted were obtained. The women were informed about the research subject and purpose, and their written and verbal informed consent was obtained. The study was conducted in accordance with the Principles of the Declaration of Helsinki.

Data analysis

The data were analyzed using Statistical Package for the Social Sciences (SPSS) software, version 22.0 (IBM, Chicago, IL). Whether the data showed normal distribution was determined by Shapiro-Wilk test. Chi-square test was used to compare socio-demographic and obstetric characteristics of the groups. Independent sample t-test was used for comparisons between groups when parametric test assumptions were met, and Mann-Whitney U test was used when parametric test assumptions were not met. In intragroup comparisons, repeated measures two-way analysis of variance was used when parametric test assumptions were met, and Friedman test was used when parametric test assumptions were not met. Bonferroni test was used to determine which group caused the significant difference, Cohen d test was used to calculate the effect size, and the error level of $p < 0.05$ was considered significant.

Results

When the pregnant women in the experimental and control groups were compared in terms of characteristics including age, gestational week, educational status, employment

Table 1 Socio-demographic characteristics of pregnant women

Characteristics	Experimental (n=36)	Control (n=36)	*U / p
	$\bar{X} \pm SS$ (min-max)	$\bar{X} \pm SS$ (min-max)	
Age	27.30 ± 3.37 (21–40)	27.27 ± 2.74 (23–36)	647.500 / 0.995
Gestational week	24.27 ± 1.81 (22–28)	24.44 ± 2.26 (22–28)	648.000 / 1.000
	n (%)	n (%)	** χ^2 / p
Educational status			
High School	11 (30.6)	13 (36.1)	0.250 /
University or higher degree	25 (69.4)	23 (63.9)	0.617
Employment status			
Unemployed	15 (41.7)	10 (27.8)	1.532 /
Employed	21 (58.3)	26 (72.2)	0.216
Economic status			
Income equals to expenses	22 (61.1)	26 (72.2)	1.000 /
Income more than expenses	14 (38.9)	10 (27.8)	0.317
Family type			
Nuclear family	34 (94.4)	35 (97.2)	0.348 /
Extended family	2 (5.6)	1 (2.8)	0.555
Length of Marriage			
1–2 years	30 (83.3)	25 (69.4)	1.925 /
3 years and more	6 (16.7)	11 (30.6)	0.165
Supporting person during pregnancy			
Yes	28 (77.8)	25 (69.4)	0.643 /
No	8 (22.2)	11 (30.6)	0.422

*Mann-Whitney U test ** χ^2 = chi-square test

status, economic status, family type, marriage year, and presence of a supporter during pregnancy, no statistically significant difference was found between the groups, and the characteristics showed a homogeneous distribution (Table 1; $p > 0.05$).

The pregnant women in the experimental group of 63.9% and the pregnant women in the control group of 80.6% stated that they practiced listening to music, touching, and singing with their baby. The pregnant women in the experimental group of 44.4% practiced listening to music, them touching of 58.3%, the singing of 16.7%, while the pregnant women in the control group of 58.3% practiced listening to music, them touching of 66.7%, the singing of 27.8%.

The pregnant women of 97.2% who participated in the study stated that haptonomy contributed to them. When we look at the answers they gave to these contributions, 41.1% used the expression “My attachment to my baby, my awareness and communication with my baby increased”, and 26.5% said “I feel more comfortable with my baby, I spend more time with my baby and talk more, I started to share something with my baby”.

In the intergroup comparison of experimental and control groups, mean PSS scores weren't statistically significant in the first, second, and third follow-ups ($p > 0.05$).

Table 2 Comparison of intragroup and intergroup Perceived Stress Scale mean scores of pregnant women in the experimental and control groups

PSS	Experimental (n=36) X ± SD	Control (n=36) X ± SD	**Test / p	****Effect Size (ES)
First Follow-up	25.63 ± 5.82	23.66 ± 5.08	-1.530 / 0.131	0.36
Second follow-up	23.36 ± 5.36	24.08 ± 4.83	0.600 / 0.550	0.18
Third follow-up	23.13 ± 4.72	24.30 ± 4.86	1.032 / 0.306	0.35
***Test / p	4.745 / 0.012*0.372 / 0.688			

*p < 0.05; **Independent sample t-test; ***Repeated measurements two-way analysis of variance; ****Cohen's d test; PSS: Perceived Stress Scale

In intra-group comparisons after haptotomy, there was a significant decrease in PSS scores in experimental group (p < 0.05), and significant difference wasn't found in PSS scores in control group (p > 0.05). According to post hoc Bonferroni analysis, perceived stress scores in the second and third follow-ups were found to be significantly lower than in the first follow-up. In intergroup comparisons, the effect size (ES) was evaluated, in accordance with the criteria suggested by Cohen (1988), a large effect size was found in the first (ES = 0.36), second (ES = 0.18), and third follow-ups (ES = 0.35), but significant difference wasn't found (Table 2).

While statistically significant difference wasn't found between experimental and control group's W-DEQ version A mean scores at the first follow-up (p > 0.05), the difference was significant at the second and third follow-ups (p < 0.05). W-DEQ A version scores in the experimental group after haptotomy were statistically significantly lower than the control group in the second and third follow-ups. In intragroup comparisons, there was a significant decrease in W-DEQ A version scores in the experimental group (p < 0.05), and there wasn't significant difference in W-DEQ A version scores in the control group (p > 0.05). According to post hoc Bonferroni analysis, it was determined the significant difference detected in the experimental group was between the first and second follow-up, and between the first and third follow-up. W-DEQ version A scores in the experimental group for the second and third follow-ups were significantly lower than in the first follow-up. In intergroup comparisons, a large level of effect size was determined, and significant difference wasn't found in the first follow-up (ES = 0.16) in line with the criteria suggested by Cohen (1988). A large effect size was detected in the second (ES = 0.67) and third follow-up (ES = 0.80), and a significant difference was found (Table 3).

While there wasn't statistically significant difference between the experimental and control groups in terms of

Table 3 Intragroup and intergroup comparisons of the mean scores of the Wijma Birth Expectation/Experience Scale Version A of the pregnant women in the experimental and control groups

W-DEQ Version A	Experimental (n=36) X ± SD	Control (n=36) X ± SD	**Test / p	****Effect Size (ES)
First Follow-up	61.47 ± 25.63	65.38 ± 22.84	605.5 / 0.632	0.16
Second follow-up	45.30 ± 25.58	61.72 ± 23.20	398.5 / 0.05*	0.67
Third follow-up	42.94 ± 25.40	62.69 ± 23.816	372.5 / 0.002*	0.80
***Test / p	22.40 / 0.001* 0.561 / 0.755			

*p < 0.05; **Mann-Whitney U test; ***Friedman test; ****Cohen's d test; W-DEQ A: Wijma Birth Expectation/Experience Scale Version A

Table 4 Comparison of intra-and intergroup Prenatal Attachment Inventory mean scores of pregnant women in the experimental and control groups

PAI	Experimental (n=36) X ± SD	Control (n=36) X ± SD	**Test / p	****Effect Size (ES)
First Follow-up	66.66 ± 9.73	64.91 ± 9.19	574.5 / 0.407	0.18
Second follow-up	72.13 ± 7.86	66.91 ± 10.00	444.5 / 0.021*	0.58
Third follow-up	74.16 ± 8.74	68.05 ± 9.45	385.5 / 0.003*	0.67
***Test / p	10.15 / 0.004*28.90 / 0.172			

*p < 0.05; **Mann-Whitney U test; ***Friedman test; ****Cohen's d test; PAI: Prenatal Attachment Inventory

mean PAI scores in the first follow-up (p > 0.05), the difference between PAI scores in the second and third follow-up was statistically significant (p < 0.05). Mean PAI scores in the experimental group after haptotomy were significantly higher than the control group. Pregnant women in the experimental group are more strongly attached to their unborn babies than pregnant women in the control group (Table 4).

In intragroup comparisons, the difference between PAI scores in the experimental group at the first, second and third follow-up was significant (p < 0.05), while the difference between PAI scores in the control group wasn't significant (p > 0.05). It was determined that the significant difference detected in experimental group was between the first follow-up and the second follow-up, between the first follow-up and the third follow-up, and between the second follow-up and the third follow-up. PAI scores in the experimental group were significantly higher at the second and third follow-ups compared to first follow-up, and at the third follow-up compared to second follow-up. In intergroup comparisons, in accordance with the criteria suggested by Cohen (1988), a large effect size was determined in the first follow-up (ES = 0.18), and significant difference wasn't found. A large effect size was detected in the second

(ES=0.58) and third follow-up (ES=0.67), and a significant difference was found.

Discussion

Haptonomy, starting from the prenatal period, supports the individual's self-actualization in a more advanced and reassuring way than physical contact of touch (Poirier, 2011). Moreover, haptonomy allows mothers and fathers to establish emotional contact with their babies through mother's womb during prenatal period (Arabin & Metz, 2020).

In this study, conducted to determine the effect of haptonomy on perceived stress, fear of childbirth, and prenatal attachment, there wasn't significant difference in terms of perceived stress in intergroup comparisons, but perceived stress levels of the haptonomy group decreased in the second and third follow-ups. Haptonomy reduces stress levels of pregnant women and prevents negative effects of stress. However, this effect wasn't at the expected level among the groups. Perceived stress in prenatal period may be associated with young age, high income, low education level, current depression, panic disorder, domestic violence, and pregnancy complications (Woods et al., 2010). Therefore, it is thought that the expected effect between the groups wasn't observed, since the groups undergoing haptonomy and those that didn't have similar characteristics. Accordingly, while our H₁ hypothesis was rejected, H₄ hypothesis was accepted. Pregnancy is a stressful period in mother's life, and the mother's way of coping with stress during this period may be related to maternal and newborn health outcomes. Therefore, mother's positive perception of stress can enable her to cope with stress successfully and increase her psychological well-being (Basharpour et al., 2017). Haptonomy, one of the non-pharmacological methods, is also considered among the relaxation methods providing relief for the pregnant (Arslan & Temiz, 2019). Therefore, haptonomy is thought to be effective in reducing stress levels of pregnant women in the experimental group. It has been stated in the studies that haptonomy is a respectful and safe type of touch used to reduce the anxiety of women and prevent negative effects on the pregnant and baby (Adam, 2012; Paica, 2017). Moreover, as the mother calms down, the baby becomes calmer in the womb (Dolto, 2018). These findings in the literature support our findings.

Birth fears of the pregnant women in the experimental group to whom haptonomy was applied decreased compared to the control group. Furthermore, in haptonomy group, the fear of childbirth decreased significantly in the second and third follow-ups compared to the first follow-up, and it was observed haptonomy increased the ability of pregnant women to cope with the fear of childbirth. Accordingly, our

H₂ and H₅ hypotheses were accepted. Practices to reduce the fear of childbirth are important for better adaptation to pregnancy and reducing cesarean section levels due to fear of childbirth (Klabbers et al., 2016). There are limited studies on the fear of childbirth related to haptonomy (Adam, 2012; Klabbers, 2018; Tison, 2019). In Adam's (2012) study, it was stated that haptonomy reduces fears and anxieties, increases women's self-confidence by helping them relax in delivery room. As a result of the study by Paica (2017), she provided psychological counseling in prenatal and postnatal period and used haptonomy, it was found that the mothers' fears decreased. In another randomized controlled study, it was reported that haptonomy reduced the fear of childbirth (Klabbers et al., 2017). Our findings are similar to the results of this study in the literature.

In our study, prenatal attachment levels of pregnant women in the experimental group who underwent haptonomy were significantly higher. Haptonomy strengthened the bonds of pregnant women with their unborn babies and supported the strengthening of the sense of motherhood. Accordingly, our hypotheses "there is a difference between prenatal attachment scores of pregnant women applied or not applied with haptonomy" and "there is a difference between prenatal attachment scores of the haptonomy applied group before and after haptonomy" (H₃ and H₆) were accepted. The activities including prenatal attachment, being a desired baby, viewing the baby, feelings of the pregnant towards the fetus, speaking with baby, and touching are affected by the development of pregnant woman's perception and identity of motherhood (Koc Ozkan et al., 2020). In our study, it was determined nearly half of the pregnant women undergoing haptonomy practiced listening to music with their babies (44.4%), while more than half did one of the practices including touching (58.3%) and singing (16.7%). Therefore, it is thought that prenatal attachment is high as a result of these practices of pregnant women. Haptonomy has started to be included in health services with a multidisciplinary team in recent years (Hanley et al., 2013; Vignoli, 2016) stated that haptonomy is a separate practice focusing only on the mother and father's communication with the baby (Vignoli, 2016). In the literature, it is stated that haptonomy increases emotional attachment in prenatal period and may be effective for parents with low attachment (Adam, 2012; Bist et al., 2021; Fernández Fernández-Arroyo, 2020; Kaur, 2020; Pollmann & Hoffenaar, 2017). In a study, it was reported that touch developed from the second month, communication was established with fetus through vibrations, and attachment between parent and baby was increased with haptonomy (Tison, 2019). In another study, it is stated that haptonomy increases the attachment of fathers with both spouses and children (Kaur, 2020). This approach helps parents develop emotional bonds with their babies (Bist et

al., 2021). Our finding that haptonomy increases prenatal attachment is remarkable and parallels with the findings of other studies.

Limitations

This research has several limitations. Results obtained from this study cover only primiparous pregnant women living in the Central Anatolia Region of Turkey and cannot be generalized to all pregnant women. Another limitation of the study is that pregnant women included in the sample were obtained from a single center and home visits were made with pregnant women living in the city center. Additionally, not including multiparous pregnant women may be another limitation of the study.

Conclusions

In the study, it was found that haptonomy decreased perceived stress and fear of childbirth in pregnant women within 22–28 weeks of gestation and increased prenatal attachment. According to these results, using haptonomy to reduce perceived stress and fear of birth in pregnant women, to increase prenatal attachment, supporting pregnant women to practice haptonomy at home when they apply for check-ups and to do it with their spouses, training midwives on haptonomy, and conducting different studies on haptonomy with different sample groups in which spouses also participate more actively are recommended.

Acknowledgements As researchers, we would like to thank all our participants who participated in the data collection phase.

CRedit authorship contribution statement **Hilal Ozbek:** Conceptualization, Investigation, Visualization, Writing – original draft, Writing – review & editing. **Sukran Ertekin Pinar:** Conceptualization, Formal analysis, Methodology, Supervision, Writing – original draft, Writing – review, editing.

Funding This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data Availability The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Declarations

Declaration of competing interest The authors report no conflict of interest.

Ethical approval Ethics Committee approval for Non-Interventional Clinical Research (decision no: 2020-01/21) and written permission (no: 112571053) from the institution where the study was conducted were obtained.

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