International Journal of Haptonomy and Haptotherapy (2018), vol.3, nr.1

Does haptotherapy benefit mother-child bonding in women with high fear of childbirth?

Gert A. Klabbers[1], K. Marieke Paarlberg[2] and Ad J.J.M. Vingerhoets[3]

Abstract

Objective: To evaluate the effect of haptotherapy during pregnancy on mother-child bonding (MCB).

Population or Sample: Primigravida and multigravida (N = 73).

Methods: Data were obtained from a randomized controlled trial study on treatment for severe fear of childbirth with haptotherapy. Fear of Childbirth (FOC) was evaluated using the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) and mother-child bonding (MCB) by an online version of the Pictorial Representation of Attachment Measure (PRAM). Screen-positive women for severe FOC were randomly assigned either to a haptotherapy (HT) arm or a no-haptotherapy (No-HT) arm (psycho-education via internet or care as usual). In this group, a median split was carried out on the PRAM to allow focusing on the women with the 50% poorest MCB levels. Measurements were on four occasions: (T1) 20-24 weeks of gestation, (T2) 36 weeks of gestation, (T3) 6 weeks postpartum, and (T4) 6 months postpartum. Repeated measurements ANOVA was carried out on the basis of the as-treated principle.

Main Outcome Measures: MCB measured with the PRAM across two measurement occasions T1 and T4.

Results: In the group of women with high MCB, we found no statistically significant difference in the mean PRAM change scores between the HT arm and the no HT-arm, $F(3, 69) = 2.009$, $p = .121$. However, in the group of women with low MCB, women in the HT arm showed a statistically significant greater improvement of mother-child bonding than in the no-HT, $F(3, 69) = 2.877$, $p = .042$.

Conclusion: Haptotherapy during pregnancy can statistically significantly increase mother-child bonding in women with a high fear of childbirth and a poor MCB as compared with psycho-education via internet or care as usual.

Article history
Received 12/07/2017
Revised 01/08/2018
Accepted 01/10/2018

Keywords
Haptotherapy, pregnant women, mother-child bonding.

Introduction

Mother-child bonding (MCB) can be considered as positive thoughts and feelings of the mother towards her child (Brandon, Pitts, Denton, Stinger & Evans, 2009). Ideally, these thoughts and feelings develop in pregnancy several months before a child is born, and, according to prenatal attachment theories, they will facilitate ante- and postpartum maternal behavior and caregiving (Brandon et al., 2009).

The development of feelings of bonding is facilitated by the physical development of the fetus and by psychological adjustments accompanying the upcoming motherhood (Dubber, Reck, Müller & Gawlik, 2015).

MCB has the function of securing the nurturing and protection of the child and positively influences maternal health practices during pregnancy and postpartum (Alhusen, Gross, Hayat, Rose & Sharps, 2012; Carter & Keverne, 2002). Because of the importance of MCB, we wondered whether haptotherapy (HT) positively influences MCB in women with severe FOC. To evaluate the effect of HT on MCB, we were interested whether there was a difference in MCB throughout pregnancy and

[1] **Gert A. Klabbers** (corresponding author). Ph.D. student Tilburg University, Warandelaan 2, 5037 AB Tilburg, the Netherlands. GZ-Haptotherapist, Physiotherapist and Haptonomic pregnancy counselor at Therapy Center, Ietje Kooistraweg 25, 7311 GZ Apeldoorn, the Netherlands. E-mail: praktijk@gertklabbers.nl.
[2] **K. Marieke Paarlberg**, PhD. Department of Obstetrics and Gynaecology, Gelre Hospitals, Apeldoorn location, the Netherlands.
[3] **Ad J.J.M. Vingerhoets**, PhD. Department of Medical and Clinical Psychology, Tilburg University, Warandelaan 2, 5037 AB Tilburg, the Netherlands.

postpartum between women who obtained HT as compared with women who obtained a no-haptotherapy (no-HT) intervention: psycho-education via the internet (INT) or care as usual (CAU). Since the results are most clinically relevant for women with low MCB, we focused on the women in the lowest half of MCB scores on the PRAM.

Haptotherapeutic treatment has shown to be an effective intervention to reduce severe fear FOC in pregnant women, as compared with two control conditions (psycho-education via internet and care as usual) (Klabbers, Wijma, Paarlberg, Emons & Vingerhoets, 2014). HT makes pregnant women more familiar with perceived and experienced physical sensations (Klabbers et al., 2014).

Moreover, HT facilitates the development of specific skills influencing the cognitive appraisal of contact with the fetus, giving birth and labeling childbirth as a more normal and positive life event (Klabbers et al., 2014). Therefore, one might expect that HT also has a positive influence on MCB bonding. In the current research report, we evaluate the effect of HT on MCB as compared with women in the control conditions in a group of women with severe FOC.

Method

Design of the original research protocol: Between April 2012 and June 2015, 555 pregnant women were recruited through 35 Dutch community midwifery practices, gynecologists at a teaching hospital, or the project's website. Women who provided informed consent received a login code by email and were requested to digitally complete the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) (Wijma, Wijma & Zar, 1998).

Inclusion criteria for the intervention study were singleton pregnancy, age ≥ 18 years, and a W-DEQ score ≥ 85, i.e., suffering from severe fear of childbirth (Zar, Wijma & Wijma, 2001). Exclusion criteria were multiple pregnancies and a history of psychotic episodes.

The participants with a high WDEQ-score were randomly (True-Random-Number-Service, 2012) assigned to (1) HT, (2) INT, or (3) CAU (Klabbers et al., 2014).

Design of this study: The MCB scores were assessed at four occasions. Questionnaires were sent by e-mail: admission to the study at 20–24 weeks of gestation (T1); 36 weeks of gestation (T2); 6 weeks postpartum (T3), and six months postpartum (T4). The project had a secured internet environment to facilitate the completion of the online questionnaires.

For our analysis, we used the data from those participants who completed the questionnaires at all four measurements occasions (T1, T2, T3, T4). We performed a median split on the PRAM scores and analyzed the whole group, the groups with the lowest half and the highest half PRAM scores respectively, see figure 1. Since we assumed that social support might positively influence MCB, we controlled for it in the analysis.

Measures

MCB was measured using an online version of the Pictorial Representation of Attachment Measure (PRAM) (Van Bakel, Maas, Vreeswijk & Vingerhoets, 2013). The PRAM was recently introduced as a potential valid, quick, and easy-to-administer instrument of parent-infant bonding (Van Bakel et al., 2013), see fig. 1.

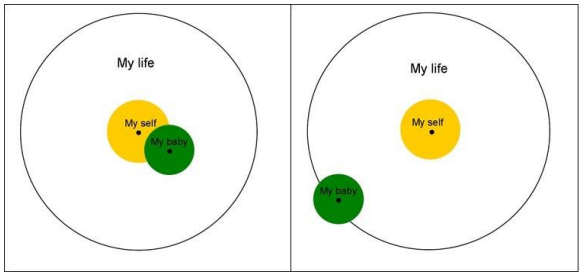

Figure 1: Two examples of the Pictorial Representation of Attachment Measure (PRAM).

Research findings revealed that, as was also found with other MCB measures (De Cock et al., 2016), the PRAM showed meaningful associations with a validated questionnaire measuring mother and father bonding. Since all questionnaires were being sent by email, we used a digital version in this study, similar to the paper one, but not yet validated in digital format. Participating pregnant women were shown a white screen with a big circle, which represents her life as it currently is. A yellow

circle in the center of the big circle represents the woman's 'Self.' Next to the big circle, a green circle represents the fetus/infant at a certain moment, in our study the moments T1-T4. The mother's task was to move the infant circle to a certain place in the circle representing her life at this moment. The outcome measure was the Self-Baby-Distance (SBD), i.e., the distance (in millimetres) between the centres of the 'Baby' and the mother's 'Self' circles. The score on the PRAM is inversely related to MCB, i.e. a higher PRAM score indicates lower MCB.

FOC was measured using the 33-item W-DEQ (Wijma et al., 1998), with a 6-point Likert scale ranging from `not at all` (= 0) to `extremely` (= 5), yielding total scores ranging from 0 to 165. Internal consistency and split-half reliability of the W-DEQ is 0.87 (Wijma et al., 1998). We used a cut-off score of 85, i.e., a W-DEQ score ≥ 85 indicating that the mother suffers from severe FOC, in agreement with the author of the W-DEQ (Wijma & Wijma, 2017). In the current study, at T1, the Cronbach's α was .95. Social support – as a potential confounder – was measured by the Social Support Questionnaire (SSQ) (Sarason, Sarason, Shearln & Pierce, 1987). The SSQ is a valid instrument for measuring social support and has good psychometric properties (a Cronbach's α of .92). With questions especially designed for this study, information was collected about the participants' biographic characteristics, such as age, education, partner, and primi-/multigravida (Klabbers et al., 2014).

Interventions

1. *Haptotherapy* was applied according to the guideline developed for this purpose (Klabbers, 2017). HT aims to facilitate the development of changes in the pregnant mother's appraisal of giving birth and labeling childbirth as a more normal and positive life event, which may ultimately lower fear of childbirth. This intervention, described in detail by Klabbers et al. (2014), consisted of training participants in a combination of skills, which are taught in eight one-hour sessions between gestational week 20 and 36. Preferably, the partner of the pregnant woman also attends every session and actively participates in the exercises (Klabbers, 2017).
2. *Psycho-education via the internet* consisted of eight modules (and a brief test) during eight weeks between gestational week 20 and 36, providing information about the ordinary course of pregnancy, labor, and birth (Nieminen & Wijma, 2011). Participants also could ask questions about their own situation.
3. *Care as usual* was conducted according to the standards of the Royal Dutch Organization of Midwives (KNOV) (KNOV, 2017) and the Dutch Organization of Obstetrics and Gynaecology (NVOG) (NVOG, 2017).

Statistical Analyses

To evaluate the effects of HT on MCB, repeated measurements ANOVA were carried out across four measurement occasions: (T1) 20-24 weeks of gestation, (T2) 36 weeks of pregnancy, (T3) 6 weeks postpartum, and (T4) 6 months postpartum.

We compared PRAM scores, using groups defined by the treatment as received (`as treated analysis`) (Armijo-Olivo, Warren & Magee, 2009). The experiment-wise Type I error rate was set at 5% level.

Additionally, we performed a multiple regression analysis with the type of intervention (HT, no-HT), social support and parity at T1 as predictors. As dependent variable, we used the change in MCB between T1 and T4.

Results

At T1, PRAM scores were obtained from 484 respondents, of whom 146 completed the PRAM at all four measurement occasions (T1, T2, T3, and T4). In this group a median split was carried out, i.e., 50% lower half PRAM scores at T1 (n=73) and 50% higher half PRAM scores at T1 (n=73), see figure 2. See table 1, for all baseline characteristics.

Repeated measurements ANOVA for the total group and the low PRAM (high MCB) group revealed no significant difference in the mean PRAM change score between T1 and T4, respectively, $F(3, 142) = 2.193$, $p = .092$ and $F(3, 69) = 2.009$, $p = .121$.

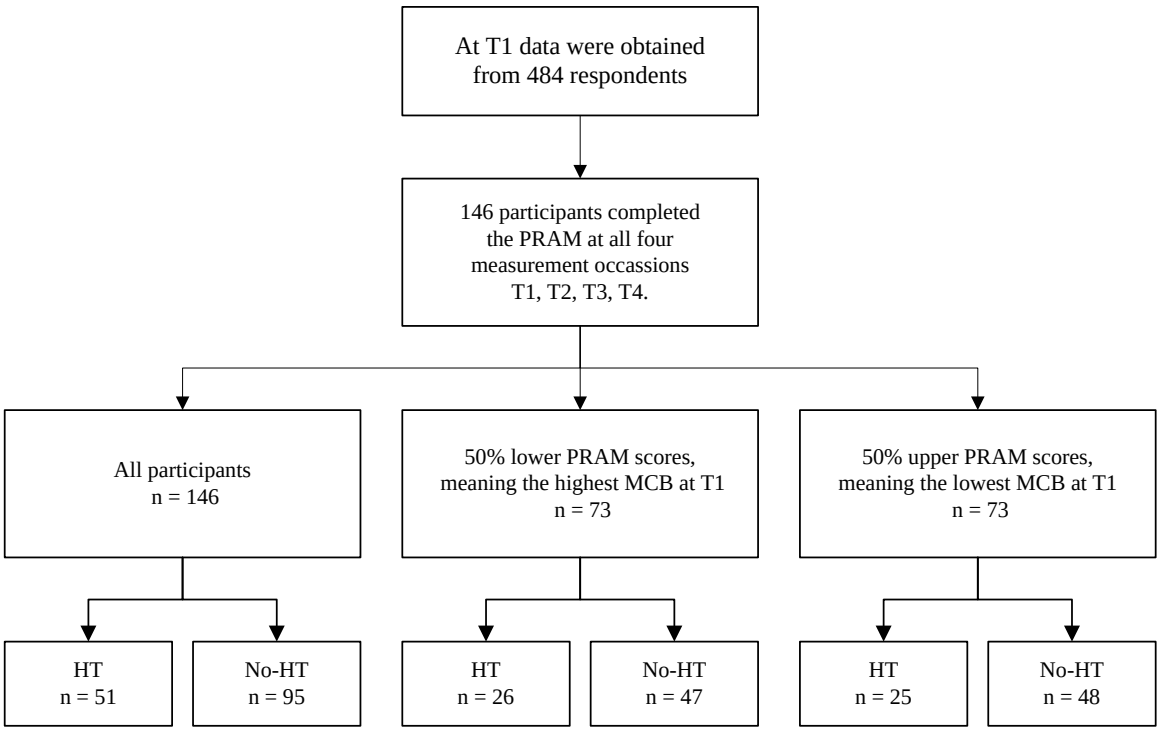

Figure 2: Allocation overview. T1: 20-24 weeks of gestation. T2: 36 weeks of gestation. T3, 6 weeks postpartum. T4: 6 months postpartum. PRAM: Pictorial Representation of Attachment Measure; MCB: mother-child bonding. HT: haptotherapy. No-HT: combined groups (Psycho-education via internet + care as usual).

Table 1: Sample characteristics and PRAM measurements T1-T4

PRAM scores		All (n=146)				Lower half (n=73)				Upper half (n=73)			
Intervention		HT		No-HT		HT		No-HT		HT		No-HT	
N		51		95		26		47		25		48	
Age (M years)		33.3		31.7		34.0		32.4		32.5		31.0	
		n	%	n	%	n	%	n	%	n	%	n	%
Primigravida		25	49.0	61	64.2	14	53.8	31	66.0	11	44.0	30	62.5
Multigravida		26	51.0	23	35.8	12	46.2	16	34.0	14	56.0	18	37.5
High educational level		41	80.4	65	68.4	23	88.5	30	63.8	18	72.0	35	72.9
Medium educational level		10	19.6	29	30.5	3	11.5	16	34.0	7	28.0	13	27.1
Low educational level		0	0	1	1.1	0	0	1	2.2	0	0	0	0
Partner		50	98.0	93	97.9	26	100	46	97.9	24	96.0	47	97.9
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
T1	PRAM (mm.)	71.3	11.5	69.7	8.9	62.9	7.2	62.8	6.3	80.1	7.9	76.5	4.9
	SSQ	24.1	4.8	25.4	4.2	24.0	5.3	24.4	4.8	24.2	4.4	26.3	6.2
T2	PRAM (mm.)	70.9	10.3	70.4	7.8	69.8	10.8	67.6	8.3	72.0	9.8	73.1	6.2
	SSQ	25.6	4.0	25.7	3.9	25.6	4.1	24.4	4.4	25.5	3.9	26.9	3.0
T3	PRAM (mm.)	68.9	6.6	70.8	7.0	68.0	6.4	68.8	7.7	69.9	6.7	72.7	5.8
	SSQ	-	-	-	-	-	-	-	-	-	-	-	-
T4	PRAM (mm.)	70.9	7.0	69.6	7.9	70.9	7.9	66.2	7.9	71.0	7.3	72.8	5.8
	SSQ	24.6	4.6	25.2	4.4	23.7	5.0	24.0	4.4	25.5	4.0	26.4	4.1

T1: 20-24 weeks of gestation. T2: 36 weeks of gestation. T3: 6 weeks postpartum. T4: 6 months postpartum PRAM: Pictorial Representation of Attachment Measure. Lower half PRAM scores: upper half mother-child bonding. Upper half PRAM scores: lower half mother-child bonding. HT: Haptotherapy. No-Haptotherapy: (psycho-education via internet + care as usual). SSQ: Social Support Questionnaire (not measured at T3).

For clinical reasons, we focused in particular on the group with poorest MCB, i.e. those women with the highest PRAM scores, in which at 20-24 weeks of gestation (T1) the average PRAM score was significantly higher in the HT group than in the combined no-HT groups (psycho-education via internet and care as usual), $F(1,71) = 5.735$, $p = .019$, see table 1. At 36 weeks of gestation (T2), the average PRAM score was significantly lower (meaning MCB was higher) in the HT group than in the combined no-HT, see table 1.

The HT group showed a significantly greater increase of MCB as represented in the PRAM scores than the no-HT groups together (psycho-education via internet + care as usual) by repeated measures ANOVA, $F(3,69) = 2.877$, $p = .042$, suggesting that in the HT group MCB was more increased than in the no-HT, see figure 3. In the no-HT group no statistically significant difference in mean PRAM change score between INT and CAU was found.

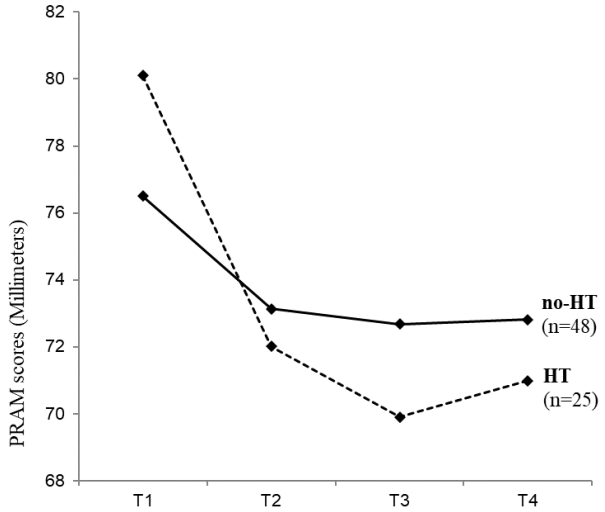

Figure 3: Means of MCB (PRAM score) across four measurement occasions. T1: 20-24 weeks of gestation. T2: 36 weeks of gestation. T3, 6 weeks postpartum. T4: 6 months postpartum. HT: haptotherapy. No-HT: combined groups (Psycho-education via internet + care as usual). PRAM: Pictorial Representation of Attachment Measure; high PRAM score means low MCB. MCB: mother-child bonding.

Table 2 shows the results of the regression analysis using AT analysis with parity and social support at T1 and the interventions as predictors. The dependent variable was the PRAM-scale change scores between T1 and T4 (i.e., T4-T1), with positive scores reflecting improvement of MCB. The intervention had a statistically significant positive effect on PRAM scores, controlled for parity and social support at T1. The HT group showed a more substantial decrease in average PRAM scores than the no-HT groups. When controlled for parity and social support, the haptotherapeutic intervention uniquely accounted for 5.5% of the variance in change score, see table 2.

Table 2: Results of multiple regressions using AT analysis with parity and social support at T1 and the interventions as predictors, and the PRAM-scale change scores T1 - T4 as dependant variable. (significant values printed in boldface).

	Δ PRAM T4-T1	
	B	r^2_{pr}
Parity at T1	-.360	0.0%
Social Support Questionnaire at T1	.318	1.5%
Intervention		**5.5%**
Haptotherapy	**4.742**	
No-Haptotherapy	**---**	
R-square		**9.8%**
N	73	

Note. r^2_{pr} is the squared semi-partial correlation, which reflects the proportion of the totaal variance in the dependent variable (in %) that is uniquely explained by the predictor. AT: As treated. PRAM: Pictorial Representation of Attachment Measure. T1: 20-24 weeks of gestation. T4: 6 months postpartum.

Discussion

The objective of this study was to evaluate whether HT would have a positive influence on MCB. In comparison to the control conditions INT and CAU, HT seems to have a positive effect on MCB in the group representing the 50% lowest MCB on the PRAM.

Whereas we already demonstrated that HT can reduce feelings of fear of childbirth, the current results additionally yielded evidence that this intervention has the potential to improve MCB in women who report low MCB at the beginning of pregnancy. However, caution should be exercised with the interpretation of our results, since at T1 there were some notable differences between the intervention and the control group. Firstly, there was a statistically significant difference in the mean PRAM score of the HT group and the no-HT group, and, secondly, the HT group consisted of fewer primiparous women and thus more multiparous women than de no-HT group.

Nevertheless, at T1 the PRAM score was higher in the HT group which suggests that in the intervention group suffered from poorer MCB and this group had the steepest, statistically significant decline in PRAM scores, reflecting an improvement in MBC. This strongly suggests a positive effect of the intervention in this particular group. We may carefully state that HT likely improves MCB in a group of pregnant women with high FOC and low MCB. However, it is too early to conclude whether this finding also has clinical relevance.

A subsequent logical question is what possible mechanism may underlie the MCB improvement. We propose that the haptotherapeutical intervention in the pregnant woman might stimulate affective thoughts and feelings of the mother towards her child. Further research is needed to explore the possible working mechanism of HT in encouraging MCB.

However, the study also suffers from some limitations. First, we opted for the ‘as-treated design.' In the randomized controlled trial, 25 women who were allocated to the control arm chose to follow haptotherapy by themselves. This thus resulted in a selection bias, since when one has the conviction that HT will be more effective to reduce FOC than the control condition, this might influence the results. Second, the HT group contained more multiparous women than de no-HT group. This also might reflect a certain selection bias, since these women might have known from a previous pregnancy what HT might do to them. Thirdly, the study participants who received HT all were women with an initial score of 85 or higher on the WDEQ, indicating severe fear of childbirth, which also may result in a selection bias. Fourthly, we chose to consider the 50% pregnant women with the lowest level of MCB as the clinically relevant group. But in this study, this PRAM cut-off score has been used for the first time. In future studies it would be interesting to compare prenatal PRAM scores with postnatal PRAM scores and mother-infant attachment scores, assessing the best cut-off score in ROC-curves.

We recommend further research on this topic. Since MCB and active mother-infant interaction is thought to prevent insecure attachment in the child (Ainsworth, 1982; Bowlby, 1969; Brandon, 2009), for indicated prevention it is essential to design interventions that can already be applied during pregnancy. A logical next step is to study haptotherapy on MCB in an unselected group of pregnant women since in this study- only women with high FOC participated. Furthermore, since the PRAM is a rather new instrument for determining prenatal MCB, more evidence is needed to determine a clinically relevant cut-off score of the PRAM and to test whether this outcome is associated to postnatal mother-baby attachment.

Conclusion

In the group of the 50% pregnant women with high FOC and with the lowest MCB, we demonstrated positive effects of HT on MCB, as compared with psycho-education via internet and care as usual. In the group of women with the highest MCB, we found no statistically significant difference.

HT seems a promising intervention in improving MCB during pregnancy in women with severe FOC and low MCB. However, it is too early to conclude whether this finding also has clinical relevance.

Acknowledgements

First of all, we would like to express our gratitude to the participating pregnant women and their partners. We also thank DJ. Pot for his support as confidential physician, as well as all the involved obstetricians, practice assistants, and gynecologists who recruited pregnant women. We further acknowledge K. Nieminen and K. Wijma for accessibility and the translation into Dutch of their text ‘Information om graviditet och förlossning för föderskor’ from their CBT program for childbirth anxiety (Nieminen et al, 2011), and A. Duindam for his support with translation. We thank W.H.M. Emons for his statistical support. Last but not least, the authors thank all the participating healthcare haptotherapists.

Disclosure of interests

The authors declare that they have no competing interests.

Contribution to authorship

This study was designed by GAK, KMP, and AJJMV. All collaborators should be considered as co-authors as they have significantly contributed to the development of the study and the writing of the manuscript. All authors have read and approved the final manuscript.

Details of ethics approval
This research has been approved by the Dutch Medical Ethics Review Committee and is registered under ABR number: NL34900.008.11.

Funding
This research received a grant from the Dutch Working Group on Psychosomatic Obstetrics and Gynaecology (Dutch: Werkgroep Psychosomatische Obstetrie en Gynaecologie), and the Dutch Association of Haptotherapists (Dutch: Vereniging van Haptotherapeuten). The funders have not participated in the investigation, nor in the writing of the paper.

Abbreviations
ANOVA: Analysis of variance. CAU: care as usual. FOC: Fear of childbirth (as measured by the W-DEQ). HT: Haptotherapy. INT: Psycho-education via internet: MCB: Mother-child bonding. No-HT: combined groups (psycho-education via internet + care as usual). PRAM: Pictorial Representation of Attachment Measure. ROC: receiver operating characteristics. Severe FOC: W-DEQ score ≥ 85. T1: 20-24 weeks of gestation. T2: 36 weeks of gestation. T3: 6 weeks postpartum. T4: 6 months postpartum. W-DEQ: Wijma delivery expectance/ experience questionnaire.

References
Ainsworth, M. D. S. (1982). *Attachment: Retrospect and prospect*. New York: Basic Books.

Alhusen, J. L., Gross D., Hayat M.J., Rose L., Sharps P. (2012). The role of mental health on maternal-fetal attachment in low-income women. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 41*, 71-81.

Armijo-Olivo, S., Warren S, Magee D. (2009). Intention to treat analysis, compliance, drop-outs and how to deal with missing data in clinical research: A review. *Physical Therapy Reviews, 14*(1), 36-49.

Bakel, H. J. A. v., Maas A.J.B.M., Vreeswijk, C.M.J.M., Vingerhoets A.J.J.M. (2013). Pictorial representation of attachment: measuring the parent-fetus relationship in expectant mothers and fathers. *BMC Preganancy & Childbirth, 13*, 138.

Bowlby, J. (1969). *Attachment and Loss, Volume 1: Attachment* (Vol. 1). New York: Basic Books.

Brandon, A. R., Pitts S., Denton W.H., Stringer A., Evans H.M. (2009). A history of the theory of prenatal attachment. *Journal of Prenatal and Perinatal Psychology and Health, 23*(4), 201-222.

Carter, C. S., Keverne E.B. (2002). The neurobiology of social affiliation and pair bonding *Hormones, Brain, and Behavior* (Vol. 1, pp. 299-337). San Diego: Academic press.

De Cock, E. S. A., Henrichs J., Vreeswijk C.M.J.M., Maas A.J.B.M., Rijk. C.H.A.M., Bakel J.A. van. (2016). Continous feelings of love? The parental bond from pregnancy to toddlerhood. *Journal of Family Psychology, 30*(1), 125-134. doi: http://dx.doi.org/10.1037/fam0000138

Dubber, S., Reck C., Müller M., Gawlik S. (2015). Postpartum bonding: the role of perinatal depression, anxiety and maternal–fetal bonding during pregnancy. *Archives of Women's Mental Health, 18*, 187-195.

Klabbers, G. A. (2017). Guideline Haptotherapy in case of Fear of Childbirth (Dutch: Richtlijn Haptotherapie bij Bevallingsangst), available from http://bevallingsangst.nl/Richtlijn%20Haptotherapie%20bij%20Bevallingsangst.pdf

Klabbers, G. A., Wijma K., Paarlberg K.M., Emons W.H.M., Vingerhoets A.J.J.M. (2014). Treatment of severe fear of childbirth with haptotherapy, a multicentre randomized controlled trial. *BMC, Complementary and Alternative Medicine, 14*, 385.

Klabbers, G. A., Wijma K., Paarlberg K.M., Emons W.H.M., Vingerhoets A.J.J.M. (2017). Haptotherapy as a new intervention for treating fear of childbirth: a randomized controlled trial *Journal of Psychosomatic Obstetrics and Gynecology*, 1-10. doi: http://dx.doi.org/10.1080/0167482X.2017.1398230

KNOV. (2017). Royal Dutch Organization of Midwives, available from www.knov.nl

Nieminen, K., Wijma K. (2011). Information om graviditet och förlossning för förstföderskor; en kurs i åtta moduler. *Intern rapport Unit of Medical Psychology, Linköping University, Linköping, Sweden*.

NVOG. (2017). Dutch Organization of Obstetrics and Gynaecology, available from www.nvog.nl

Sarason, I. G., Sarason BR, Shearln EN, Pierce GR. (1987). A brief measure of social support: practical and theoretical implications. *Journal of Social and Personal Relationships, 4*, 497-510.

True-Random-Number-Service. (2012). True-Random-Number-Service, available from http://www.random.org/integers

Wijma, K., Wijma B, Zar M. (1998). Psychometric aspects of the W-DEQ: a new questionnaire for the measurement of fear of childbirth. *Journal of Psychosomatic Obstetrics and Gynecology, 19*, 84-97.

Wijma, K., Wijma B. (2017). A woman afraid to deliver - how to manage childbirth anxiety, Chapter 1. In K. M. Paarlberg, Wiel, H.B.M. van de (Ed.), *Biopsychosocial Obstetrics and Gynaecology*. Switzerland: Springer International Publishing.

Zar, M., Wijma K., Wijma B. (2001). Evaluation of the Wijma Delivery Expectancy/Experience (W-DEQ) as a diagnostic test for disabling fear of childbirth *Zar M, Diagnostic aspects of fear of childbirth* (Vol. Fifth article). Linköping: Linköping University.