Received: 31 January 2025 | Revised: 24 March 2025 | Accepted: 13 May 2025

DOI: 10.1002/pcn5.70127

PCN Reports
Psychiatry and Clinical Neurosciences
Open Access

ORIGINAL ARTICLE

Clusters and case vignettes of impaired maternal–fetal bonding in pregnancy: A mixed method approach

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Funding information
JSPS KAKENHI, Grant/Award Number: 21H03255 (PI: Yukiko Ohashi); T. and F. Kitamura Foundation for Studies and Skill Advancement in Mental Health, Grant/Award Number: 202201

Abstract

Aim: Clinical attention to and understanding of women with impaired fetal bonding is important for early therapeutic intervention. This study aimed to clarify the clinical characteristics of women belonging to groups derived by cluster analysis of impaired maternal–fetal bonding.

Methods: A mixed-method approach was adopted. We conducted a two-wave internet survey targeting pregnant women less than 36 gestational weeks by using a questionnaire (33-item Dimensional Assessment of Mother Baby Organization Questionnaire [DAMBO Q33]) with subsequent online interviews (Dimensional Assessment of Mother and Baby Organization-Research Version). The maternal–fetal bonding disorder items in the DAMBO Q33 were entered into a two-step cluster analysis. Two representative cases from each of the clusters, except for the positive bonding cluster, were selected to describe their clinical pictures. Finally, quantitative data and qualitative data were integrated and interpreted.

Results: A two-step cluster analysis elicited four clusters: bonding disorder ($n = 101$), ambivalent bonding ($n = 156$), positive bonding ($n = 173$), and lack of bonding emotions ($n = 122$). Women in the bonding disorder cluster were characterized by seriously negative feelings towards the fetus. Women in the ambivalent bonding cluster wished to be pregnant but were not sufficiently ready for the transition into parenthood. Women in the lack of bonding emotions cluster were characterized by a lack of strong interest in pregnancy and the fetus.

Conclusion: Patterns of impaired maternal–fetal bonding were identified. We should not think of a pathological category of mental illness among them but recognize that such parents are targets for professional assessments and supportive (therapeutic) interventions. Understanding the meaning of getting pregnant and difficulties in the process of maternal role attainment is required.

KEYWORDS
ambivalent bonding, case vignette, clinical characteristics, fetal bonding disorders, grouping, lack of bonding emotions, positive bonding

INTRODUCTION

Emotional interaction between parent and child brings various messages and meanings among them. Understanding the nature of parents' emotions when they think about their own child is essential in determining parental attitudes and behaviors towards a child in the process of attaining parental role. Hada et al. defined the parent's emotions towards a child as "bonding" under the rubric of human emotions, consisting of basic and self-conscious emotions.[1] Once parent-to-child emotions are disturbed or disordered, parent–child interaction quality worsens,[2,3] and problems for the child may well arise.[4]

Bonding disorder is a psychological condition in which a parent expresses dislike, resentment or hatred for his/her child, expresses the desire for permanent relinquishment of care, and has experienced a wish that the child disappears.[5] Perinatal bonding disorders include maternal–infant and maternal–fetal bonding disorders. It has been reported that perinatal maternal bonding disorders predict problems of both mothers' and children's mental health. Maternal–fetal bonding predicts maternal–infant bonding[6,7] thus it is of clinical importance to identify women with impaired fetal bonding, named fetal bonding disorder, at an early stage to start therapeutic intervention for them. Maternal–fetal (antenatal) bonding disorders have therefore recently attracted clinical and research attention.[8–14]

Thus far, researchers have looked at maternal–fetal bonding disorders as having a continuous (i.e., not clearly distinguishable) nature. Women who score higher in a maternal–fetal bonding measure need more vigorous intervention. Nevertheless, groupings of cases of maternal–fetal bonding disorders are important because they cast light on the types of interventions that perinatal health professionals may take. A recent study of ours showed that pregnant women may be classified into four groups using a method of cluster analysis.[15] The four groups (clusters) were named positive bonding, bonding disorder, ambivalent bonding, and lack of bonding emotions. The clinical features of women belonging to the different groups of maternal–fetal bonding clusters have been less studied.

RESEARCH AIMS AND QUESTION

The overarching aim of this study was to explore perinatal mental healthcare in the Japanese context from the perspectives of pregnant women. The study sought to answer the following question: What are the characteristics of pregnant women's psychological symptoms in the different types of maternal–fetal bonding?

METHODS

Research design

The study used a mixed-methods approach as defined by Creswell and Plano Clark.[16] Cluster analysis as quantitative data helped to determine the typology of symptoms of maternal–fetal bonding disorders. Case vignettes as qualitative data provided pregnant women's perceptions of pregnancy and clinical features: What are the characteristics of their psychological symptoms in the different types of maternal–fetal bonding? Finally, quantitative and qualitative findings were integrated and construed as the answers to the question and clinical views on the implications of clinical practice.

Participants

This manuscript reports a part of the study for the development of assessment tools for antenatal psychological symptoms. In waves 1 and 2, we conducted an internet questionnaire survey between August 29 and September 7, 2022 (wave 1) and between May 15 and 31, 2023 (wave 2). The survey was performed via an internet application by Luna Luna Baby (MTI Ltd.). Inclusion criteria were pregnant women less than 36 gestational weeks with a reasonable command of Japanese. It was found that the participants came from almost all prefectures in Japan. Participation was anonymous except for mailing addresses. The number of internet questionnaires was 294 for wave 1 and 258 for wave 2. All the women were solicited to participate in an internet interview. Of these women, 111 (38%) and 111 (43%) women agreed to be interviewed online in waves 1 and 2, respectively (Figure S1).

Measurements

The internet questionnaire used was the DAMBO Q33 (T. and F. Kitamura Foundation for Studies and Skill Advancement in Mental Health).[17] This is a brief participant report outcome measure covering different aspects of pregnancy specific mental health issues. It covers (a) depression (16 items, including three items that were also used for suicidality), (b) tokophobia (four items), (c) maternal–fetal emotions (nine items), (d) suicidality (three items), (e) emesis (two items), and (f) social dysfunction (two items). These items were rated with a 7-point scale: 1 = not at all to 7 = very much so.

The fetal bonding assessment of the DAMBO Q33 included nine items representing basic and self-conscious emotions of mothers towards their fetus. Our previous study defined parent-to-child emotions as immediate emotions that a parent has towards her fetus/child.[1] The concepts of emotions as immediate emotions were adapted to a scale that is measurable across a child's age stages and a parent's gender. This scale is the Scale of Parent-to-Child Emotions (SPCE) and includes five basic (happiness, fear, anger, sadness, and disgust) and four self-conscious (shame, guilt, alpha pride, and beta pride) emotions.[1] We selected one item each from the nine domains of the SPCE. Fetal bonding items were selected from the items of the SPCE and adopted to the DAMBO Q33. Item difficulty, discrimination parameters, and item information function according to item response theory were considered in the item selection procedure. The single item with the best discriminant parameter and middle

difficulty among the item set of nine domains of the SPCE was selected for the DAMBO Q33.

The interview, the Dimensional Assessment of Mother and Baby Organization-Research Version (DAMBO RV; T. and F. Kitamura Foundation for Studies and Skill Advancement in Mental Health),[18] was on average of a 30-min duration. The DAMBO RV covers (a) demographic features (age), (b) obstetric features (gestation in weeks, fetal movement, and number of past pregnancies and deliveries [term, immature, and still birth], termination of pregnancies, abortions, and neonatal deaths), (c) psychological response to the current pregnancy, (d) desirability of pregnancy and the duration and content of infertility treatment, (e) preferred model of delivery (vaginal, neuraxial anesthesia, Caesarean section, and others), (f) depression (22 dichotomous items, including seven items that were also used for suicidality), (g) tokophobia (six items), (h) foetal bonding disorder (FBD) (nine items), (i) suicidality (two essential and five sequential dichotomous items), and (j) emesis (two items with a 5-point scale). Items in (c), (d), (g), and (h) were rated with a 5-point scale: from 0 = not at all to 5 = very much so. Most of the items corresponded to those in the DAMBO Q33. A total of seven trained interviewers (one psychiatrist, two obstetricians, and four midwives) had an interview with the participant. Their assessment showed excellent interrater reliability. Intra-class correlation ranged between 0.90 and 1.00, making all the interviewers view randomly selected 15 recorded interviews and rated independently.[19–21]

Data analyses

Quantitative data (statistical analysis)

The maternal–fetal bonding disorder items were entered into a two-step cluster analysis. Cluster analysis can group cases into one or more clusters so that cases are similar within their own cluster but different from the other clusters in terms of the characteristics of the symptoms in question.[22] Two-step cluster analysis is a composite approach that first uses a distance measure to separate groups and then a probabilistic approach (similar to latent class analysis) to select the optimal subgroup model. Two-step cluster analysis is considered one of the most reliable forms of analysis in terms of the number of subgroups identified, the probability of assigning individuals to subgroups, and the reproducibility of findings in clinical and other types of data.[23,24] Silhouette coefficients were calculated to discreteness of clusters. A higher silhouette coefficient represents better discreteness. Taking into consideration our past report, we set the number of clusters as four.[25] We used four input indicators for two-step cluster analysis: positive basic (happiness score), negative basic (sum of the scores of the anger, fear, sadness, and disgust items), positive self-conscious (sum of the scores of the shame and guilt items), and negative self-conscious (sum of the scores of the alpha pride and beta pride items). After two-step cluster analysis, we examined the validation of the classification with a one-way analysis of variance and Tukey post hoc comparisons for the scores of four input indicators and age, gestational week, and number of deliveries. A chi-square test was performed for parity.

Qualitative data (case vignettes)

We chose two cases which each well reflected the cluster characteristics of the three clusters (except for the positive bonding cluster). Cases were selected based on the SPCE scores (Table S1) of individuals and clinical impressions from interview data. The audio recordings of the DAMBO RV interviews were carefully transcribed. We read the transcripts carefully and discussed them many times so that we could capture clinical features. The researcher's intent when analyzing the qualitative data was to analyze and explore personal experiences, life histories, personality characteristics, and psychological symptoms: how did the women have the meanings of pregnancy and childbirth? Careful reading of the transcripts and psychological views were required at each stage for analysis. This method of multistage layering of systematic analysis added rigor to the study.[26,27]

RESULTS

The findings presented here were selected to demonstrate how this study can provide both statistical data and narrative data to increase understanding of the clinical features of women with mother-to-fetus bonding disorders. Examples of the qualitative data are presented by means of three particular narrative themes alongside three bonding disorder clusters.

Quantitative results (Cluster analysis)

All 552 responses to the wave 1 and 2 internet questionnaires were used for analysis as quantitative data. For the initial step, we calculated the mean, standard deviation, skewness, and kurtosis for each indicator (Table 1). Skewness and kurtosis for all domains were low (<2.0 and <3.0, respectively), indicating normal distributions.

A two-step cluster analysis was conducted which set the number of clusters at four.[25] The silhouette index was 0.3. The emerging four clusters were named bonding disorder (cluster 1, $n = 101$), ambivalent bonding (cluster 2, $n = 156$), positive bonding (cluster 3, $n = 173$), and lack of bonding emotions ($n = 122$), taking into consideration our previous report.[25]

The bonding disorder cluster was characterized by lower positive basic and positive self-conscious, and higher negative basic and negative self-conscious scores. The ambivalent bonding cluster was characterized by overall high negative and positive emotions, indicating ambivalent attitudes towards a fetus. The positive bonding cluster was characterized by higher positive basic and positive self-conscious, and lower negative basic and negative self-conscious scores. Thus, they were healthy pregnant women in terms of FBD. The lack of bonding emotions cluster was characterized by lower

scores in all positive and negative emotion scores (Table 2 and Figure 1). Age, gestational week, number of deliveries, and parity did not show differences between the four clusters (Table 2).

We followed the four-cluster model proposed by Hada et al. [25] and identified virtually the same patterns of the SPCE subscale scores. One of four clusters seemed healthy in terms of FBD and thus cases were not scrutinized.

Qualitative findings (case vignettes)

Bonding disorder cluster

The story of Ms. A: Ms. A, 31 years old, had a history of miscarriage. She said that she had a plan to commit suicide during the present pregnancy, which was not desired. She complained of severely depressed mood, lack of interest, insomnia, lack of energy, reduced self-esteem, and poor concentration. Her depression had persisted for years but was enhanced by an incident of severe abuse towards her mother by her father. This was followed by an escape to the house of the partner's parents. Since her childhood, she had been abused physically and psychologically by her father. She used to be nearly strangled to death by him. Her psychiatric history included borderline personality disorder, dissociative disorder, several episodes of depression, and drug use disorder together with several suicide attempts. She thought about her fetus a little times a day with little joy, no pride as a parent, and with strong anger, shame, and guilt. She stated she had no fear of childbirth except for strong fear about the baby's abnormality. She was referred to psychiatric consultation.

The story of Ms. B: Ms. B was 36 years old, at 38 gestational weeks, and a mother of 3-year-old daughter. The current pregnancy was preceded by a miscarriage about a year before. Obstetrical history was not very happy. The first child was delivered after prolonged labor pain followed by an emergency Caesarean section. There was evidence of mild postnatal depression afterwards. Her miscarriage was at 7 weeks' gestation. Since then, she did not expect very much about the next pregnancy but did not use any contraception. When she realized that she had become pregnant, she felt surprised and perplexed saying "I am not good at child raising and not confident to be a mother of two kids. It is almost fear to be with my child without the other family members." She was also concerned about whether the current pregnancy would be problematic like her previous one.

Ms. B did not think about the fetus frequently but when she did she felt happy, with little guilt and shame, but felt little pride. She also felt sad, particularly in the evening. She often wondered whether she could become a really good mother and whether she should carry on

TABLE 1 Mean, standard deviation, skewness, and kurtosis for SPCE subscale scores ($N = 552$).

SPCE subscale scores	Mean	Standard deviation	Skewness	Kurtosis
Positive basic	6.07	1.12	−1.44	2.61
Negative basic	9.71	5.27	0.95	0.39
Positive self-conscious	7.71	2.19	−0.39	0.83
Negative self-conscious	5.68	3.19	0.43	−0.92

Note: Positive basic score = happiness; negative basic score = anger + fear + sadness + disgust; positive self-conscious score = alpha pride + beta pride; negative self-conscious score = shame + guilt.

Abbreviation: SPCE, Scale of Parent-to-Child Emotions.

TABLE 2 Two-step cluster analysis with the four clusters ($N = 552$).

	Cluster					
	1 ($n = 101$) Bonding disorder	2 ($n = 156$) Ambivalent bonding	3 ($n = 173$) Positive bonding	4 ($n = 122$) Lack of bonding emotions	F (3,548)	Post hoc comparison Tukey test
Positive basic	4.4 (1.1)	6.5 (0.5)	7.0 (0.2)	5.6 (0.7)	375.244***	1 < 4 < 2 < 3
Negative basic	13.7 (5.4)	12.8 (5.2)	6.2 (2.8)	7.4 (3.0)	113.495***	3 = 4 < 2 = 1
Positive self-conscious	5.6 (2.4)	7.7 (1.6)	9.2 (1.6)	7.4 (1.7)	86.124***	1 < 4 = 2 < 3
Negative self-conscious	8.3 (2.8)	8.5 (1.9)	3.2 (1.4)	3.4 (1.4)	351.459***	3 = 4 < 1 = 2
Age	33.2 (4.6)	32.1 (5.0)	31.5 (4.9)	32.7 (4.5)	3.047*	3 < 1
Gestational week	18.6 (9.9)	20.6 (9.8)	20.0 (8.9)	18.0 (9.3)	2.158^{NS}	
Number of deliveries	0.32 (0.75)	0.42 (0.89)	0.30 (0.62)	0.41(0.82)	0.964^{NS}	
Multipara	21/101 (21%)	43/156 (28%)	39/173 (23%)	32/122 (26%)	χ^2 (df) = 2.100 (3)^{NS}	

Note: Silhouette index = 0.3.

Abbreviation: NS, not significant.

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

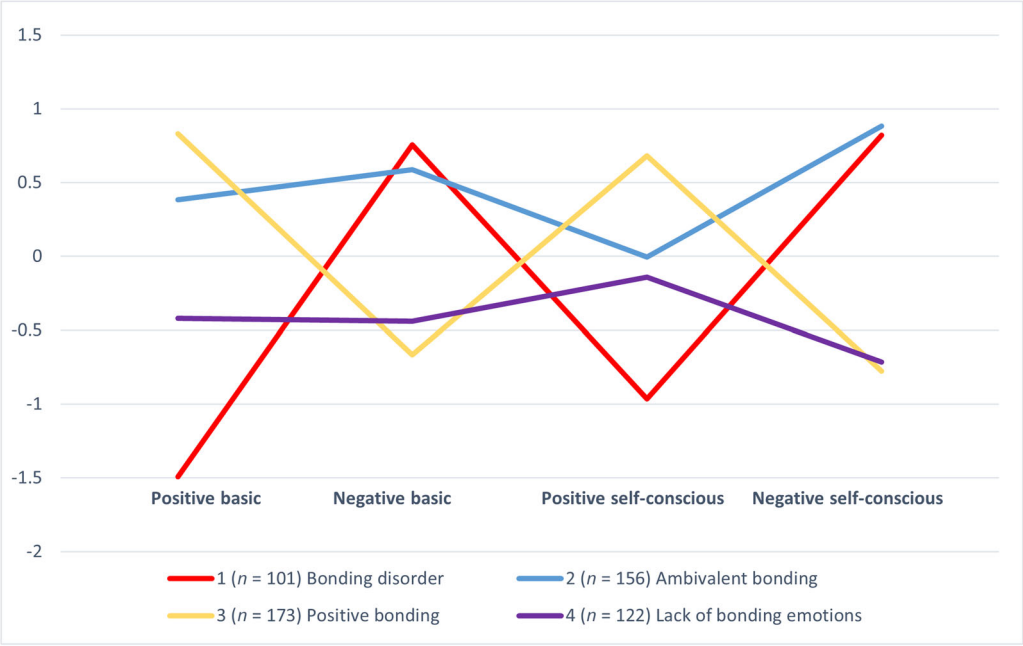

FIGURE 1 SPCE subscale scores (*z* scores) by cluster. The red line is cluster 1 (bonding disorder, *n* = 101), the blue line is cluster 2 (ambivalent bonding, *n* = 156), the yellow line is cluster 3 (positive bonding, *n* = 173), and the green line is cluster 4 (lack of bonding emotions, *n* = 122). Positive basic score = happiness; negative basic score = anger + fear + sadness + disgust; positive self-conscious score = alpha pride + beta pride; negative self-conscious score = shame + guilt.

with the pregnancy. She had no idea about what to do when she was alone and something went wrong with the baby. She complained that she had no one to talk to and felt sad and afraid of being abandoned and cut off from society. She complained of severe tiredness, daytime sleepiness (but early awakening), loss of interest in things that used to be interesting (e.g. watching a movie), loss of appetite, and poor concentration. She did not show suicidality. Tokophobia was characterized by strong fear of labor pain, medical procedures, own life risk, and child's abnormality. She did not talk about this with her partner because "talking to a partner would not help when I gave birth to a different looking baby." When she talked to workplace peers, she felt that many things were changing without her knowing and was wondering whether she could resume her job and catch up with her colleagues.

Ambivalent bonding cluster

The story of Ms. C: Ms. C, 39 years old, was married for the first time only two years ago. She wanted to be pregnant and planned to start infertility treatment before she found herself pregnant. She said "I was surprised rather than happy. I do not think I was ready for pregnancy." She often thought about the fetus with happy feelings but her feeling of pride was moderate. In addition, she felt ashamed and guilty when she did things actively such as moving to a new house and preparing for the wedding party. Another feeling she had for the fetus was neither sadness nor disgust but strong "concern" and "anxiety". She feared labor pain but did not show other tokophobia symptoms. There were no signs of antenatal depression other than daytime sleepiness, tiredness, and poor concentration. She had no friends to whom she could openly talk.

The story of Ms. D: Ms. D, 26 years old, 8 weeks' gestation, became pregnant for the first time after in vivo fertilization. When thinking about the fetus, she was very happy but not proud as a mother. She was very cautious due to extreme anxiety during the infertility treatment, saying to herself "not to expect too much until the heartbeat was confirmed". This was what, she said, made her feel ashamed as a mother to the baby. She blamed herself for walking too much when she noticed bleeding and feelings of "inferiority complex" because "other women can become pregnant without treatment." She experienced emesis but there were no signs of tokophobia or antenatal depression other than retardation and tiredness.

Lack of bonding emotions cluster

The story of Ms. E: Ms. E, 32 years old, was a mother of two children (9-year-old daughter and 2-year-old son). She was at 25 weeks' gestation. Thinking about the fetus, she said she was happy but had no feeling of pride nor any other emotions. There were no signs of tokophobia nor antenatal depression other than increased appetite, a few awakenings during the night, and tiredness; however, these symptoms did not affect her performance as a nurse.

The story of Ms. F: Ms. F, 29 years old, was a first-time mother. She was at 13 weeks' gestation. She did not expect to be pregnant very much. She only occasionally thought about the fetus. She said

she felt very happy, but had no signs of either positive or negative emotions. She planned to go back to her home of origin for the childbirth but had not yet determined the maternity clinic. She did not complain of emesis.

Summary of qualitative findings (case vignettes)

Having observed the women, who were grouped into four clusters (one healthy cluster and three clusters with maternal–fetal bonding difficulties), we picked two representative cases each from these three clusters and described their clinical pictures. Women belonging to the bonding disorder cluster had strong negative emotions represented by anger, shame, and guilt towards their fetus. Severe depression and emesis were often combined with suicidality. They had hard experiences relating to pregnancy or childbirth, such as miscarriage (both Ms. A and Ms. B) or birth trauma (Ms. B, after prolonged labor pain followed by an emergency Caesarean section). They had a negative image of their own fetus as a fear object (strong fear about the baby's abnormality). They had common negative experiences that threatened their own lives (Ms. A, severe abuse; Ms. B, prolonged labor and emergency Caesarean section). The severity of tokophobia was extreme towards both (a negative image of their own fetus as a fear object and threatened their own lives) directions, severe in Ms. B or no sign in Ms. A.

Women in the ambivalent bonding cluster had happy feelings but feelings of pride were moderate. Strong concern and anxiety were common among them. In addition, they felt ashamed and guilty towards their child. There were no signs of tokophobia symptoms other than fear of labor pain (Ms. C) and antenatal depression other than somatic symptoms (Ms. C, daytime sleepiness, tiredness, and poor concentration; Ms. D, retardation and tiredness).

Women in the lack of bonding emotions cluster had happy feelings but no feelings of either positive or negative emotions (both Ms. E and Ms. F). They showed lack of interest in their own child, and only occasionally thought about the fetus. There were no signs of either tokophobia or antenatal depression.

DISCUSSION

Integration of findings

This mixed-methods study provided us with deep understanding of the clinical features of maternal–fetal bonding disorders. Meaning of getting pregnant, difficulties in the process of maternal role attainment were reported with various psychological symptoms by six pregnant women. Finally, quantitative and qualitative data were integrated and interpreted. The three impaired bonding clusters were replicated. Previously, Hada et al. noted:

> It was unexpected and surprising that only one third of the parent participants were categorized as normal. Does it mean that the remaining parents are unsound and need professional intervention? The term normal has multiple meanings. Statistical norm suggests parents with high scores for negative emotion items or low scores for positive emotion items are a majority and therefore normal. On the other hand, value norm suggests parents with low scores for negative emotion items and high scores for positive emotion items are a minority but healthy (thus, normal). In contrast, our results gave us the insight that a majority of parents have difficulty in maintaining a stable affectionate tie with their child. They may struggle in everyday parenting. We do not think of a pathological category of mental illness among them (from theoretical consideration as well as lack of taxon for such a condition) but recognize that such parents are targets for professional assessments and supportive (therapeutic) interventions.[25]

The findings of this study corroborate the results of previous studies about the typology of the parent-to-child emotions.

Two cases belonging to the bonding disorder cluster were characterized by serious negative feelings towards the fetus. Ms. A was a first-time mother and Ms. B was a mother of a daughter. Both had adverse life histories. Ms. A was a victim of long-lasting child abuse by her father. Ms. B had a difficult labor (emergency Caesarean section following prolonged labor) followed by postnatal depression as well as miscarriage. She therefore lost confidence in childbirth and child rearing. She seemed to avoid thinking about the fetus, fearing mishap during the course of the current pregnancy. She showed evidence of tokophobia. Both Ms. A and Ms. B had antenatal depression. This echoed the previous literature that demonstrated an association between maternal–fetal bonding disorder and antenatal depression.[6,28] Ohara et al. performed a follow-up study on pregnant women and examined the links between maternal–fetal bonding disorder and antenatal depression.[29] They found that maternal–fetal bonding disorder predicted antenatal depression, but not the other way round.

It was a contrast that Ms. A did not complain of tokophobia but Ms. B did. Ms. B had a sad history of her first childbirth as well as a miscarriage. This is secondary tokophobia.[30–33] This type of tokophobia may be understood in the framework of posttraumatic stress. On the other hand, Ms. A, a first-time mother, had a long history of physical abuse (she was even nearly killed by her father). Hence, she became accustomed to pain. She obtained an acquired capacity for suicide.[33] Joiner et al. (p. 5)[34] claimed that humans were not designed for self-destruction and that only "those who had been through enough past pain and provocation to have habituated to the fear and pain of self-injury" were capable of suicide. Ms. A was suicidal but had no fear of labor-related pain. Of interest is that Ms. A had no tokophobia except for a strong fear about the baby's abnormality. Following a series of sessions with a psychiatrist, she obtained affectionate feelings towards her infant.

These two cases shared the same negative psychological responses towards the news of pregnancy. Ms. A's pregnancy was not desired and Ms. B's pregnancy raised surprise in her. A psychological reaction towards a pregnancy, though it was intended, may be an important element in understanding women's bonding towards a foetus.[35,36]

Unlike the bonding disorder cluster women, those in the ambivalent cluster were free from antenatal depression. They wish to be pregnant but were not sufficiently ready for the transition into parenthood. Ms. C reacted to pregnancy with surprise rather than joy and Ms. D suppressed her joy for fear of possible undesirable outcomes of pregnancy. They had insufficient self-efficacy for pregnancy and childrearing. Alternatively, they are likely to have the motherhood (parental) myth. This myth is an uncontested and unconscious assumption that is so widely accepted that its historical and cultural origins are forgotten.[37] The ideal mother image in our mind sometimes becomes an unconscious assumption or belief called the motherhood myth. The motherhood myth often gives rise to guilt emotion in the mind of the woman becoming a mother.[38–40] Therefore, their joy is overshadowed by the idea that they are not ready for parenthood or they were "bad mothers" ('Am I entitled to be a mother?'). Their anxiety and concern underlie their lack of confidence and difficulty in maternal role attainment. Koniak-Griffin [41] listed variables that enhance or prohibit maternal role attainment; she noted lack of social support and stress were two major environmental variables for difficult maternal role attainment.[40] Ms. C had a few friends to talk to and Ms. D encountered a series of negative life events.

As in the bonding disorder cases, the ambivalent cluster cases were characterized by tokophobia. This may be linked to high scores of negative bonding emotions towards a fetus. Tokophobia is likely to induce negative bonding emotions and reduce positive bonding emotions towards the foetus.[15] Identification and care for symptoms of tokophobia may improve symptoms of fetal bonding disorder and its consequences.

Lack of both positive and negative maternal–fetal bonding emotions was seen in Ms. E and Ms. F. They were both characterized by a lack of strong interest in the pregnancy and fetus. Ms. E was expecting her third child. Pregnancy may not be a special event in her life. She felt no distress and performed her job as usual. Ms. F was at 13 weeks' gestation and had no specific plan for delivery. Her maternal role attainment might come in due course. Both these women showed no sign of mental distress.

Limitations

The limitations of the present study should be described. First, all the participants voluntarily responded to our invitation on the website, therefore they may be biased in terms of their stronger willingness to take part in research interviews. Pregnant women in a daily clinical setting may differ in their clinical features. Second, our study was cross-sectional and we were unaware of the women's outcomes except for Ms. A, who was treated by a psychiatrist. A trajectory of their fetal bonding (hopefully after childbirth) should be studied in future investigations. Our interview was for research and therefore may be different from clinical interviews. Case presentations may depend on the skills of the interviewers. In our study, it happened that four of the six (67%) pregnant women were interviewed by T.K., who trained in the UK (with British qualifications) and had about 50 years' experience in psychiatry with a special interest in perinatal psychiatry. His *h* index was 50 with 11,022 citations (Researchgate, January 27, 2025). Different interviewers with different skills and expertise may obtain different clinical characteristics.

CLINICAL IMPLICATIONS

What should be done in a clinical setting? Midwives are at the frontline in caring for pregnant women. Women in the bonding disorder clusters are those who need immediate intensive intervention and treatment. They not only suffer from maternal–fetal bonding difficulties but also antenatal depression and even suicidality. As with Ms. A, referral to a psychiatrist or psychologist may be necessary. Women in the ambivalent bonding cluster may be suitable for nursing care, including counselling[42–44] and psychoeducation.[45] Women in both the ambivalent bonding and lack of bonding emotion clusters may be supported by showing the image of the fetus via an ultrasound scan.[46–50] Showing the fetal ultrasound may be combined with brief psychotherapy.

CONCLUSIONS

We confirmed, in an independent population of pregnant women, the same patterns of maternal–fetal emotions in the four clusters of pregnant women as proposed by Hada et al.[25] Also presented were the clinical characteristics of these three-cluster women (i.e., Bonding disorder cluster, Ambivalent bonding cluster, and Lack of bonding emotions cluster). To reiterate, we should not think of a pathological category of mental illness among them but recognize that such parents are targets for professional assessments and supportive (therapeutic) interventions. Understanding the meaning of getting pregnant and the difficulties in the process of maternal role attainment is required. Further research may show taxon or core symptoms for bonding disorder.

AUTHOR CONTRIBUTIONS

Toshinori Kitamura and Yukiko Ohashi designed the study. Toshinori Kitamura, Ayako Hada, Yuriko Usui, and Yukiko Ohashi analyzed the data. Toshinori Kitamura and Ayako Hada wrote the first draft. Toshinori Kitamura and Ayako Hada rewrote the manuscript. All the authors read and approved the final draft.

ACKNOWLEDGMENTS

We thank all the women who took part in this study. This work was supported by the T. and F. Kitamura Foundation for Studies and Skill

Advancement in Mental Health (Grant No. 202201) and JSPS KAKENHI Grant No. 21H03255 (PI: Yukiko Ohashi) and the T. and F. Kitamura Foundation for Studies and Skill Advancement in Mental Health (number 202201) and JSPS KAKENHI Grant Number 21H03255 (PI: Yukiko Ohashi).

CONFLICT OF INTEREST STATEMENT

Toshinori Kitamura is Chairman of the Board of Trustees and Ayako Hada and Yukiko Ohashi are Trustees of the T. and F. Kitamura Foundation for Studies and Skill Advancement in Mental Health.

DATA AVAILABILITY STATEMENT

Data used in this analysis will be available upon reasonable request to the first author.

ETHICS APPROVAL STATEMENT

This study was approved by the Institutional Review Board of the Kitamura Institute of Mental Health Tokyo (No. 2022063001). The studies were conducted in accordance with the ethical standards of the 1964 Declaration of Helsinki and its subsequent amendments or equivalent ethical standards.

PATIENT CONSENT STATEMENT

Informed consent was electronically obtained from all participants involved in this study.

CLINICAL TRIAL REGISTRATION

N/A.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Kitamura T, Hada A, Usui Y, and Ohashi Y. Clusters and case vignettes of impaired maternal–fetal bonding in pregnancy: a mixed method approach. Psychiatry Clin Neurosci Rep. 2025;4:e70127. https://doi.org/10.1002/pcn5.70127