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## Special Feature Article

### Prevalence of Perinatal Depression among Japanese Men and Women: a Meta-analysis

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#### Abstract

Perinatal depression, a mental illness that may occur either during pregnancy or within the first 12 months after delivery, can lead to maternal health problems and maltreatment of the child. Recently, perinatal depression has also been found at high rates among men. However, paternal perinatal depression is not well recognized by healthcare workers, screening and prevention systems are lacking, and there is a paucity of literature reviewing the differences in prevalence between men and women. We therefore performed a meta-analysis of the prevalence of perinatal depression in Japanese men and women. Following searches of the PubMed and ICHUSHI databases, we initially reviewed 1,317 abstracts, retrieved 301 articles, and extracted 123 studies on perinatal depression in Japanese women. Our analysis revealed a period prevalence of perinatal depression among Japanese women ranging from 11.5% to 15.1%, with a point prevalence of postpartum depression at 1 month of 14.3%. We then reviewed 1,379 abstracts, retrieved 33 articles, and ultimately extracted 15 studies on perinatal depression in Japanese men for detailed analysis. The period prevalence of paternal perinatal depression in men ranged from 8.2% to 13.2%, with the prevalence of

postpartum depression as high in men as it was in women and not significantly different between them. An increased suicide risk associated with perinatal depression has been reported previously among men as well as women, and maternal and paternal perinatal depression are reported to be correlated. Accordingly, it is necessary for women and men to be vigilant about their mental state and seek assistance when needed during the perinatal period. Psychological and social support from a family unit perspective is important to prevent parental suicide and to promote healthy development of the child.

**Keywords:** perinatal depression, prevalence, meta-analysis, men, women

### Introduction

Perinatal depression is a mental illness that develops during pregnancy or within 12 months after childbirth. It is known to potentially lead to health problems in mothers and infants and maltreatment of infants.<sup>7)26)</sup> Perinatal depression in women arises from biological, psychological, and social factors, and it has been reported that family support influences women's mental health during the perinatal period.<sup>19)</sup> Since Cox, J.L. developed the Edinburgh Postnatal Depression Scale (EPDS) in 1987,<sup>5)</sup> screening for postpartum depression has rapidly become widespread. A recent international meta-analysis reported an estimated prevalence of postpartum depression of approximately 17% (95% confidence interval [CI]: 15–20%).<sup>25)</sup> Psychological crises during the perinatal period also increase the suicide risk. Takeda et al. analyzed

unexplained deaths among perinatal women at the Tokyo Metropolitan Institute of Forensic Medicine from 2005 to 2014, and reported 63 suicides during this period (23 during pregnancy; 40 within one year postpartum).<sup>27)</sup> This number was more than double the maternal mortality rate due to obstetric physical abnormalities. Therefore, from the perspective of reducing perinatal mortality, the importance of mental health interventions for pregnant women and new mothers in the field of obstetrics and gynecology is increasing.

However, it has become clear that men also experience psychosocial crises during their partner's perinatal period and exhibit a high rate of depressive states. Furthermore, it has been reported that the onset of perinatal depression in men and women is correlated.<sup>9)</sup> This suggests that supporting fathers may ultimately

promote maternal mental stability and healthy child development.<sup>16)</sup> Therefore, it is necessary not only for women but also men to assess their own mental state and seek appropriate support during the perinatal period. However, during this period, men are strongly expected to provide support for women and children, and so psychological support for men themselves receives insufficient attention. Information provision is also inadequate. This paper outlines the characteristics and psychological aspects of perinatal depression in both men and women, referencing a meta-analysis published by the authors on the prevalence of perinatal depression in Japanese men and women. To prevent spousal suicide and promote healthy child development, it is important to address perinatal mental health issues from a family-unit perspective, encompassing not only women and children but also men.

### **I. Meta-analysis of Perinatal Depression Prevalence in Japanese Women<sup>30)</sup>**

Recently, a large-scale nationwide prospective cohort study led by the Ministry of the Environment, known as the “Japan Environment and Children’s Study (JECS),” demonstrated that the prevalence of postpartum depression among women at one month postpartum was 13.7% (n=82,489).<sup>15)</sup> Although

numerous studies have examined the prevalence of perinatal depression among Japanese women, no meta-analysis has been conducted, unlike in other countries, and no consistent consensus has been reached. Perinatal depression may be influenced by differences in the economic conditions, social support systems, and ethnic characteristics of the countries where patients reside,<sup>19)26)</sup> making it problematic to directly apply epidemiological data from other countries or regions to Japan. Therefore, considering the need to conduct research focused on Japan and its culture, we performed a meta-analysis on the prevalence of perinatal depression among Japanese women.<sup>30)</sup> A distinctive feature of this study is that it included not only papers written in English but also those written in Japanese in the analysis.

First, we searched two databases, PubMed and the Japanese Medical Abstracts (ICHUSHI), to identify studies published between January 1994 and December 2017 that reported data on the prevalence of peripartum depression. We reviewed Abstracts of 1,317 candidate studies, examined the full text of 301 papers, and included 123 studies in the analysis. The one-month prevalence of postpartum depression among 108,431 Japanese women included in the analysis was 14.3%

(Figure 1). The prevalence of depression during pregnancy was 14.0% in the second and 16.3% in the third trimesters. The prevalence of postpartum depression by period was 15.1% within the first month, 11.6% between 1 and 3 months, 11.5% between 3 and 6 months, and 11.5% between 6 and 12 months postpartum (Figure 2). Results from trend analysis using generalized linear mixed models revealed that the prevalence of depression during pregnancy increased significantly over time, while that of postpartum depression decreased significantly over time. Furthermore, comparisons of the prevalence of depression during pregnancy and postpartum showed that the value during pregnancy was significantly higher than that of postpartum depression. Additionally, compared with multiparous women, primiparous women had a significantly higher prevalence of postpartum depression (relative risk: 1.76) (Figure 3).

Furthermore, sensitivity analyses were conducted to examine the robustness of data, with a focus on heterogeneity. The results showed that excluding the study with the largest sample size ( $n=82,489$ ), namely JECS,<sup>15</sup> the prevalence of depression at one month postpartum was 14.1% (95% CI: 12.8–15.5%,  $I^2=88.1$ ,  $n=25,942$ ). No significant differences in depression

prevalence or heterogeneity were observed based on the inclusion or exclusion of JECS data. Next, sensitivity analysis was conducted with respect to the measurement tools used for perinatal depression. Since EPDS is the most widely used scale for assessing perinatal depression in women worldwide, the prevalence of perinatal depression was examined solely using data based on EPDS. The results showed that the point prevalence of postpartum depression at one month postpartum, after excluding CES-D data, was 14.1%. The period prevalence of depression during the first trimester could not be calculated because there were insufficient data reported using EPDS. The prevalence of depression during the second trimester was 11.8%. Similarly, the prevalence was 14.9% during the third trimester, and 15.0% within one month, 11.0% between 1 and 3 months, 11.8% between 3 and 6 months, and 10.8% between 6 and 12 months postpartum. The influence of CES-D data was minimal, and the robustness of the overall data was maintained.

Our findings revealed that the prevalence of postpartum depression among primiparous was higher than that among multiparous women. The reasons for this may include the following: first, multiparous women have developed a certain degree of

adaptation to the stress associated with childbirth and childcare through past childbirth experiences and have greater stress resilience. Second, women with a history of postpartum depression are known to have a higher risk of developing depression at the time of the birth of their second child.<sup>23)</sup> Such high-risk multiparous women have often already received psychoeducation about perinatal depression, and individualized support systems may already be in place. Third, if a woman experienced perinatal depression during her first childbirth and did not receive adequate care, her motivation to have a second child may decrease. Therefore, it is conceivable that women with a predisposition to perinatal depression refraining from having a second child could inadvertently result in a lower prevalence of perinatal depression among women who go on to experience subsequent pregnancies and childbirth.

According to DSM-5,<sup>1)</sup> 50% of postpartum depression cases develop during pregnancy. Consequently, attention has been directed not only to the postpartum period but also mood disorders occurring during pregnancy. Interestingly, it has been established that the prevalence of depression increases as childbirth approaches during pregnancy, and decreases over time after delivery. Our study results

also showed the highest prevalence of depression during the third trimester. A similar trend is observed in the United States, where large cohort studies reported that the prevalence of perinatal depression peaks immediately before delivery.<sup>6)</sup> Furthermore, regarding depression during pregnancy, reports have indicated that women who discontinued psychotropic medication had a higher prevalence than those who continued pharmacotherapy.<sup>4)</sup> This suggests that when prescribing pharmacotherapy to perinatal women, particular attention must be paid to ensuring patient adherence.

## II. Meta-analysis of the Prevalence of Perinatal Depression in Japanese Men

<sup>31)</sup>

Perinatal depression has recently drawn attention as a mental illness occurring not only in women but also men. International meta-analyses examining the prevalence of perinatal depression in men have suggested that the cultural background and socioeconomic factors may influence its occurrence. However, it remains unclear whether these data are sufficiently generalizable for Japanese men, and only a few reviews have specifically addressed perinatal depression in this population. Therefore, we conducted a meta-analysis to determine a reliable

estimate of the prevalence of perinatal depression in Japanese men.<sup>31)</sup>

Similar to the meta-analysis on perinatal depression in women, we searched two databases, PubMed and ICHUSHI, to identify studies that included data on the prevalence of perinatal depression in Japanese men. Data were extracted from reports published between January 1994 and June 2018. In addition to examining the period prevalence of perinatal depression among Japanese fathers, subgroup analyses were conducted to assess sex differences in perinatal depression.

After reviewing 1,379 Abstracts obtained from the databases and carefully reading the full texts of 33 papers, 15 studies were ultimately included in the analysis. The results revealed that the period prevalence of prenatal depression among men was 8.5%. Furthermore, the period prevalence of postnatal depression among men was 9.7% within one month, 8.6% between one and three months, 13.2% between three and six months, and 8.2% between six and twelve months postpartum. The prevalence of perinatal depression among Japanese men peaked between 3 and 6 months postpartum, with an overall prevalence of approximately 10% (Figure 4a). Next, subgroup analysis of sex differences in perinatal depression was conducted.

Studies that allowed comparison of perinatal depression prevalence between men and women within the same paper were collected, and a meta-analysis was performed on the relative risk of perinatal depression between sexes. The results showed that women had a significantly higher prevalence of prenatal depression than men (relative risk = 1.79; 95% CI: 1.66–1.94). However, no significant difference in the prevalence of postnatal depression was observed between men and women (relative risk = 1.16; 95% CI: 0.71–1.90) (Figure 5). The depression assessment scales included in our study were EPDS, CES-D, K6, and SDS (Self-rating Depression Scale). Therefore, including these different measurement instruments in the meta-analysis was considered to influence the heterogeneity of the results<sup>2</sup>. Previous reports indicated that EPDS is not only the most widely used assessment tool for perinatal depression in women but is also acceptable for assessing perinatal depression in men.<sup>2)</sup> Therefore, sensitivity analysis was performed including only studies employing EPDS. After the sensitivity analysis, the prevalence rate of perinatal depression in men was 9.1% during the prenatal period. Similarly, the period prevalence of male depression within one month was 9.5%, 8.6% between 1 and 3 months, and 12.9% between 3 and 6 months

postpartum. The sensitivity analysis revealed no papers evaluating male perinatal depression using EPDS during the period from 6 months to 1 year postpartum. Furthermore, the prevalence of depression showed low to moderate heterogeneity across all periods (Figure 4b).

Our meta-analysis revealed that the prevalence of perinatal depression among Japanese men peaks between 3 and 6 months postpartum, with an overall prevalence of approximately 10%. These values are consistent with international meta-analysis results, confirming that the prevalence of postpartum depression is high in men, being similar to that in women. This suggests that particular attention should be paid to postpartum depression in men. While suicide among women due to postpartum depression is a social problem,<sup>27)</sup> it has also been reported that men may commit suicide as a result of depression during the perinatal period.<sup>22)</sup> Men face an increased risk of developing depressive states during the perinatal period, caused by stress due to changes in domestic roles and social responsibilities, which may subsequently lead to decreased marital satisfaction.<sup>8)18)</sup> Previous studies reported a major depressive disorder prevalence rate of 2.9% in the general Japanese population,<sup>11)</sup> indicating that

the prevalence of perinatal depression in men is significantly higher than that in the general population. Interestingly, the latest international meta-analysis on the prevalence of male perinatal depression also reports that the peak prevalence occurs between 3 and 6 months postpartum.<sup>2)</sup> However, there is still no clear consensus on why the peak occurs during this period.

Recent studies reported that the early detection of postpartum depression in men is difficult.<sup>10)</sup> Women's mental health issues are more likely to be detected within maternal and child health systems (e.g., infant health checkups). In contrast, male perinatal depression remains insufficiently recognized even among healthcare professionals, with inadequate screening systems and support structures.<sup>28)</sup> It has also been pointed out that healthcare providers overlooking men seeking support may act as a barrier to treatment for male perinatal depression.<sup>3)</sup> Therefore, healthcare providers' attitudes toward male perinatal depression are considered a critical issue in treating this condition.

Currently, it is rare for men to participate in maternal and child health system frameworks, such as infant health checkups, alongside women. Consequently, establishing a system for healthcare providers to directly screen

for male perinatal depression is challenging. Previous studies in Japan attempted to indirectly assess male perinatal depression through female partners; however, it has been noted that using K6, K10, or PHQ-9 may compromise the validity of the assessment.<sup>12)</sup> Consequently, identifying high-risk groups for male perinatal depression requires selecting new screening assessment tools and revising support systems utilizing online platforms.

Our findings agree with those of a prior international meta-analysis,<sup>2)</sup> suggesting that male perinatal depression can occur regardless of cultural or regional differences. The birth of a child alters family dynamics, placing strong expectations on men to fulfill economic and social responsibilities toward their families.<sup>13)21)</sup> Such societal changes occur regardless of cultural differences and impose psychological pressure on men. Therefore, factors that can occur universally across cultures, rather than those specific to different countries or cultures, may be more likely to be involved in male perinatal depression. These hypotheses have not yet been substantiated by concrete findings, and so require further investigation as a direction for future research.

### III. Psychological Aspects of Perinatal

#### Depression

Treatment for perinatal depression, like standard depression treatment, typically begins with non-pharmacological approaches. However, pharmacotherapy, including antidepressants, may be necessary. Pharmacotherapy is strongly recommended, particularly when suicidal ideation, anxiety/agitation, or psychotic symptoms are present. Nevertheless, concerns about the teratogenic potential of psychotropic drugs and their transfer into breast milk often lead to reduced treatment adherence. While antidepressants are a standard treatment for postpartum depression, women reportedly prefer psychological therapy.<sup>20)</sup> Evidence indicates that not only structured psychological therapies like cognitive behavioral therapy (CBT), but also general psychoeducation, are effective for treating and preventing perinatal depression. Conversely, it has been shown that discontinuing medication during pregnancy while undergoing treatment for depression increases the risk of relapse by a hazard ratio of 5.0.<sup>4)</sup> Therefore, flexible approaches tailored to each patient's condition are required. While assessing the patient's mental state, it is necessary to switch to relatively lower-risk medications, avoid overestimating the risk of adverse events, and provide appropriate

psychoeducation. In this regard, decision support based on Shared Decision Making, where both the clinician and patient are involved in treatment, share evidence-based medical information, and take steps toward achieving consensus on implementing the desired treatment, is considered effective in treatment for perinatal depression.

Men suffering from perinatal depression also feel that they want to talk to someone about their experience, and prefer individual or couple psychotherapy over pharmacotherapy.<sup>3)</sup> Furthermore, it has been revealed that men with strong parenting beliefs about being the ideal father and those who think “this is how one should be” regarding fatherhood experience greater anxiety and sadness.<sup>24)</sup> However, even when understanding their role as fathers, fewer than half of men show congruence between their role perception and self-identity, and many men experience significant conflict during their child's infancy.<sup>14)</sup> Becoming a “father” often takes longer for men than becoming a “mother” does for women,<sup>29)</sup> and there is also marked individual variation. Therefore, men who feel psychological distress due to placing excessive pressure on themselves regarding their role need supportive encouragement to avoid pursuing ideals too rigidly. Conversely,

at present, sufficient medical support systems for perinatal depression in men are in place compared with those for women. Consequently, a collaborative framework involving psychiatrists, obstetricians/gynecologists, pediatricians, and community health nurses is crucial. On May 29, 2020, the Japanese government approved the “Fourth Basic Plan for Measures to Address the Declining Birthrate,”<sup>17)</sup> which will guide policies for the next five years. While this document explicitly states the need for psychological support systems for women, regarding men, it primarily emphasizes their role as providers of instrumental support within the home, framed as: “promoting men's participation in housework and childcare.” It is hoped that recognition will grow to reveal that psychological support for fathers also contributes to the mental stability of mothers and infants, leading to the implementation of more effective family-based perinatal mental health support.

In Japan, community health nurses and midwives actively engage in perinatal mental health initiatives for women, including home visits and support for high-risk pregnant women. Through perinatal motherhood classes and infant health checkups, information on perinatal depression is provided, along with early intervention based on

risk factors for mental illness. For example, single parenthood, financial difficulties, and a history of mental illness are recognized as risk factors for perinatal mental health issues. However, the number of psychiatrists addressing perinatal mental health issues is limited, and collaboration between obstetrics/gynecology and psychiatry fields remains insufficient. Thus, it is considered necessary to establish a perinatal depression prevention and awareness system that places greater emphasis on multidisciplinary collaboration.

### Conclusion

This paper presented the results of a meta-analysis on the prevalence rates of perinatal depression in men and women in Japan. It also outlined the psychological aspects of perinatal depression in men, a condition that often remains overlooked. Implementing measures for male perinatal mental health is likely to benefit not only men themselves but also contribute to preventing perinatal depression in women and child abuse. Compared with women, men often take longer to develop a sense of parenthood and are more prone to experiencing distress resulting from the gap between their idealized image of fatherhood and reality. From the perspective of family psychiatry, it is essential to re-recognize

that psychological support is needed not only for mothers but also fathers.

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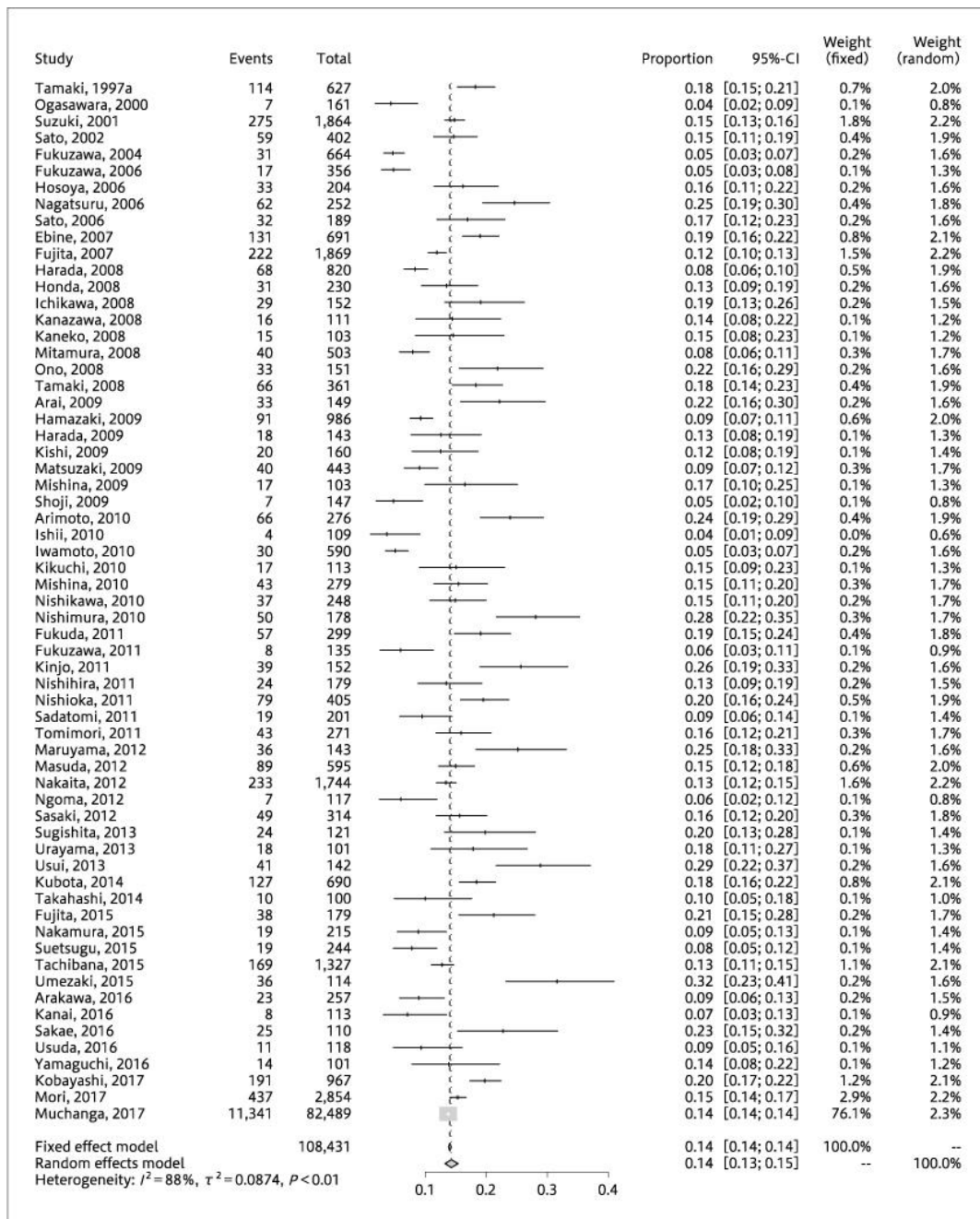
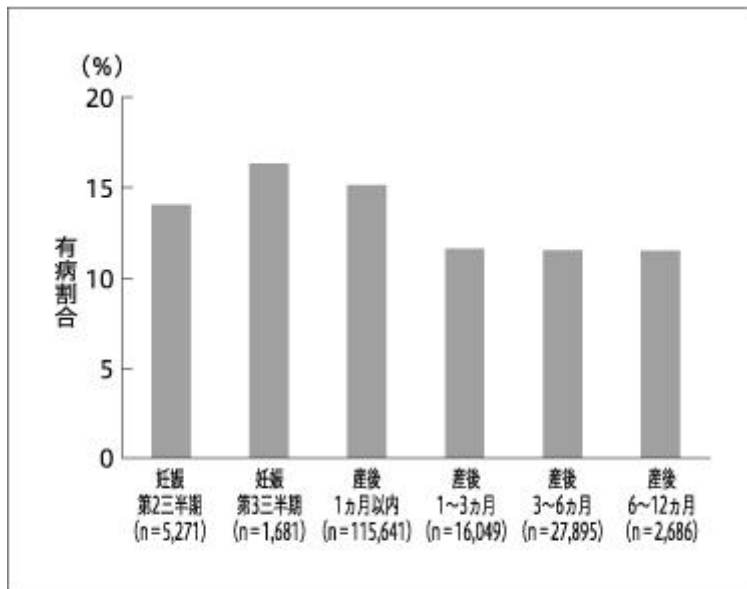


図1 産後1ヵ月時点の女性の産後うつ病有病割合

産後うつ病の1ヵ月時点の有病割合を示したフォレストプロットである。産後うつ病の1ヵ月時点の有病割合は、日本人女性108,431名を組み込んだメタアナリシスの結果、14.3%であることが判明した。  
(文献30より引用)

Figure 1: Prevalence of Postpartum Depression in Women at 1 Month Postpartum  
This forest plot shows the prevalence of postpartum depression at 1 month postpartum. The 1-month prevalence was 14.3% based on a meta-analysis incorporating 108,431 Japanese women.  
(Adapted from Reference 30)



**図2 女性の周産期うつ病有病割合**

妊娠時のうつ病の期間有病割合は、第2三半期で14.0%、第3三半期で16.3%であった。産後うつ病の有病期間は、産後1ヵ月以内が15.1%、産後1~3ヵ月が11.6%、産後3~6ヵ月が11.5%、産後6~12ヵ月が11.5%であった。  
(文献30より引用)

Figure 2: Prevalence of Peripartum Depression in Women

The prevalence of depression during pregnancy was 14.0% in the second and 16.3% in the third trimesters. The prevalence of postpartum depression by duration was 15.1% within 1 month, 11.6% between 1 and 3 months, 11.5% between 3 and 6 months, and 11.5% between 6 and 12 months postpartum.

(Cited from Reference 30)

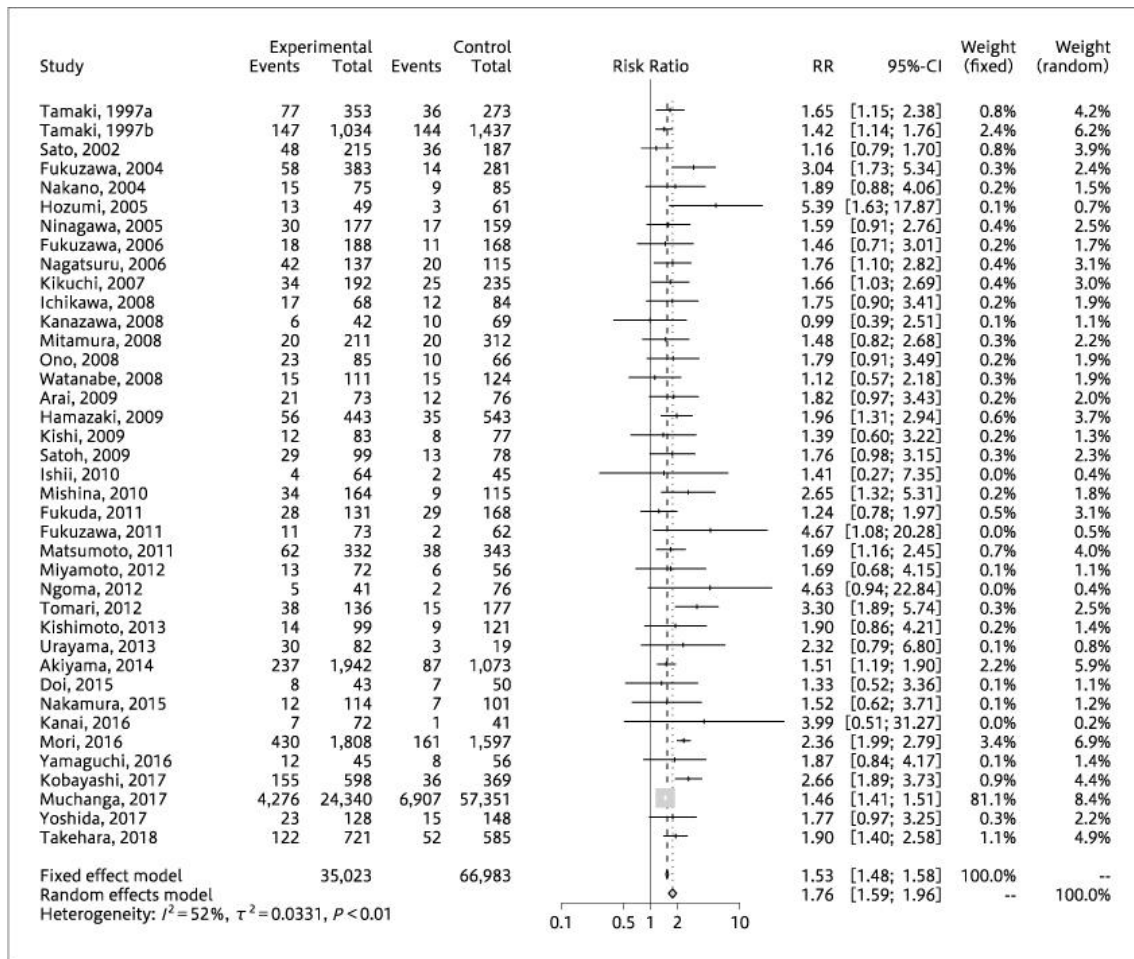


図3 初産婦と経産婦の産後うつ病リスク比

初産婦と経産婦の産後うつ病リスク比を示したフォレストプロットである。経産婦と比較して、初産婦は産後うつ病の有病割合が統計的に高いことが確認された（相対危険度 = 1.76）。  
(文献 30 より引用)

Figure 3: Risk Ratio of Postpartum Depression in Primi- vs. Multiparous Women  
This forest plot shows the risk ratio of postpartum depression between primi- and multiparous women. Compared with multiparous women, primiparous women were found to show a significantly higher prevalence of postpartum depression (relative risk = 1.76).

(Cited from Reference 30)

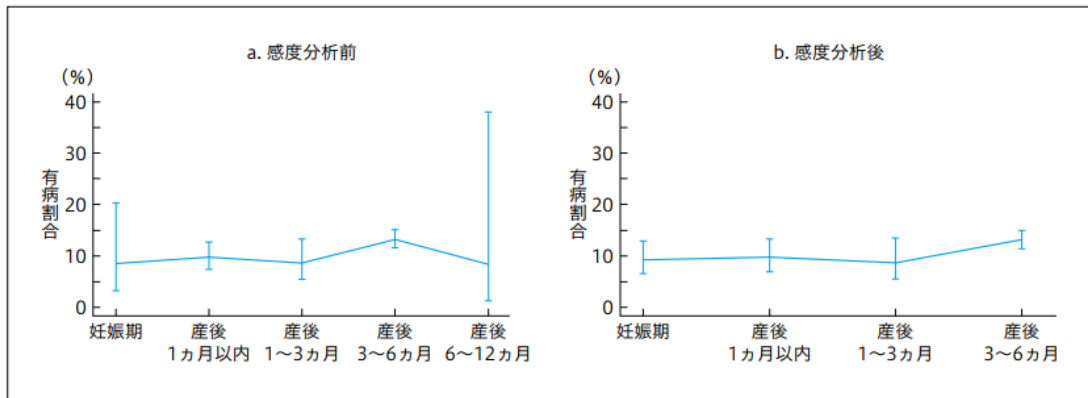


図4 男性の周産期うつ病有病割合

日本人男性の周産期うつ病の有病割合は、産後3~6か月でピークに達し、全体の有病割合は約10%であった。  
(文献31より引用)

Figure 4: Prevalence of Perinatal Depression in Men

The prevalence of perinatal depression among Japanese men peaked between 3 and 6 months postpartum, with an overall prevalence of approximately 10%.

(Cited from Reference 31)

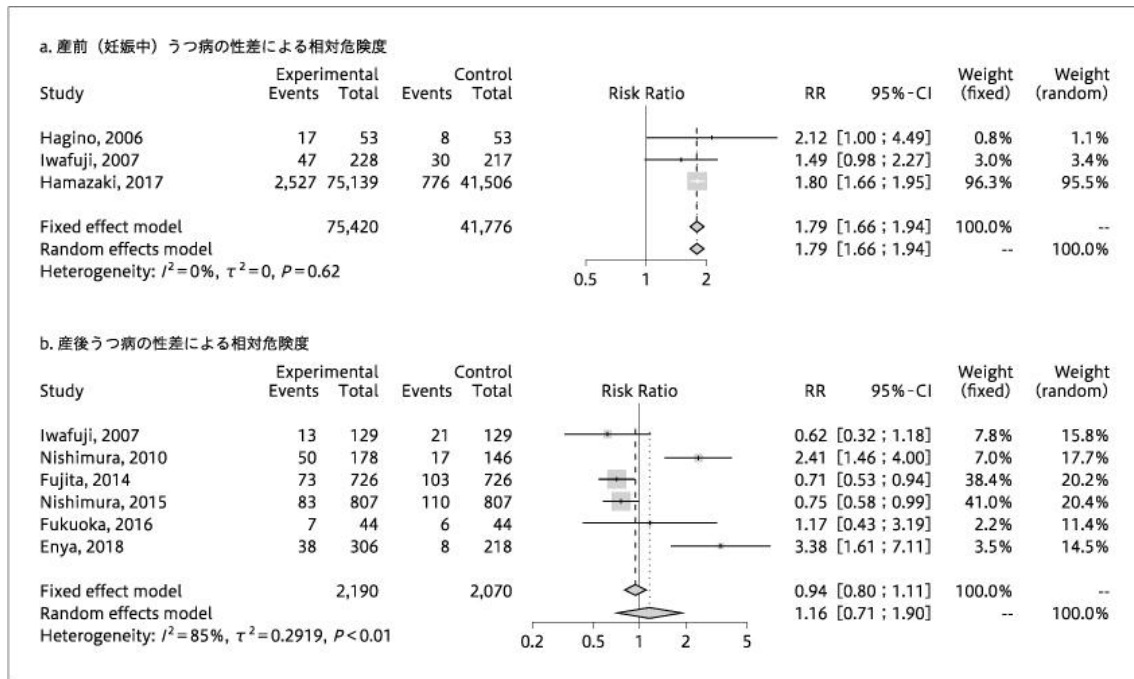


図5 周産期うつ病有病割合の性差

男女の周産期うつ病の相対危険度を示したフォレストプロットである。女性は男性よりも産前うつ病の有病割合が有意に高かったが（相対危険度=1.79）、産後うつ病の有病割合には男女間の有意差はなかった（相対危険度=1.16）。産後うつ病の有病割合が、女性同様に男性でも高いことが判明した。  
(文献31より引用)

### Figure 5: Sex Differences in Perinatal Depression Prevalence

This forest plot shows the relative risk of perinatal depression between men and women. Women had a significantly higher prevalence of prenatal depression than men (relative risk = 1.79), but there was no significant difference in the prevalence of postnatal depression between men and women (relative risk = 1.16). The prevalence of postnatal depression was high in men as well as women.

(Cited from Reference 31)