



RESEARCH ARTICLE

REVISED Relationship between postpartum depression and lactation status at a Japanese perinatal center: A cross-sectional study [version 2; peer review: 2 approved]

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Abstract

Background: Some studies have demonstrated that breastfeeding can protect mothers from postpartum depression; therefore, we examined the association between postpartum depression and lactation status at one month after delivery at a Japanese perinatal center.

Methods: We reviewed the obstetric records of all (total 809) nulliparous healthy women with vaginal singleton delivery at 37-41 weeks' gestation at our institute between July 2018 and June 2019. A face-to-face interview with the women was conducted on admission for delivery to ask whether or not they hoped to perform exclusive breastfeeding for their babies, and an additional interview was conducted one month after delivery to ask about their feeding methods currently. Maternal mental status was examined based on the scores using the Edinburgh Postnatal Depression Scale (EPDS), and women with EPDS scores of ≥ 9 points were regarded as 'positive screening'.

Results: 592 women (73.1%) hoped to perform exclusive breastfeeding for their babies on admission. Of these, at one month, 442 (74.7%) performed exclusive breastfeeding, while 150 (25.3%) performed mixed or artificial feeding. The average EPDS scores and the incidence of EPDS scores ≥ 9 points in the women performing exclusive breastfeeding were 4.3 ± 3.6 and 14.3% (63/442), respectively. They did not differ from those in the women performing mixed or artificial breast feeding [4.2 ± 3.7 , $p = 0.60$ and 13.3% (20/150), $p = 0.78$].

Conclusion: Development of postpartum depression does not seem to be associated with incomplete breastfeeding at our hospital, and therefore there are other risk factors indicated in the development of postpartum depression.

Keywords

postpartum depression, lactation status, exclusive breastfeeding, the Edinburgh Postnatal Depression Scale, Japan

Open Peer Review

Reviewer Status

	Invited Reviewers	
	1	2
version 2 (revision) 30 Jan 2020	 report	 report
version 1 04 Nov 2019	 report	

- 1 **Hiroko Iwata**, Chiba University, Chiba, Japan
- 2 **Felix Emeka Anyiam** , University of Port Harcourt, Port Harcourt, Nigeria

Any reports and responses or comments on the article can be found at the end of the article.

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Author roles: Suzuki S: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Resources, Software, Supervision, Validation, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing

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REVISED Amendments from Version 1

A short comment has been added concerning the limitations of the manuscript.

Any further responses from the reviewers can be found at the end of the article

Introduction

Exclusive breastfeeding for the first 6 months of life has been recommended because of important health, medical, social, and developmental benefits to both mothers and babies¹. Postpartum depression has been recognized as the leading medical complication among new mothers^{2,3}. To date, some risk factors for postpartum depression, such as personal and family factors, socioeconomic status, support from other family members and personal plans for furthering careers, have been examined⁴⁻⁸. Some studies have demonstrated that breastfeeding can protect mothers from postpartum depression and are starting to clarify which biological and psychological processes may explain this protection⁹⁻¹¹. In addition, a short duration of breastfeeding has been reported to be associated with the development of postpartum depression¹¹.

In Japan, the breastfeeding rate at Japan's baby-friendly hospitals (BFHs) at one month of age has been reported to be more than 75%¹²; however, inconsistent knowledge of breastfeeding benefits and inappropriate hospital practices has been reported to be associated with the increased use of infant formula and reduced breastfeeding duration, although the national breastfeeding rates had been higher than other countries of similar health status¹³. Unfortunately, only 50% of women who delivered at Japanese Red Cross Katsushika Maternity Hospital, a non-BFH institute, have performed exclusive breastfeeding for their babies at one month after delivery^{14,15}. Recently, in Japan, the population of elderly and/or high-risk pregnant women has been increased, and the rate of exclusive breastfeeding may be expected to decrease⁴. To examine the necessity of breastfeeding promotion in relation to maternal mental status, we examined the association between lactation status and postpartum depression at one month after delivery in Japanese women.

Methods

The protocol for this analysis was approved by the Ethics Committee of the Japanese Red Cross Katsushika Maternity Hospital (approval number, K2018001). Written informed consent was obtained from each woman to participate in this study at the first meeting, i.e. before birth.

Participants

We reviewed the obstetric records of all nulliparous healthy women ($n = 809$) with vaginal singleton delivery at 37–41 weeks' gestation at Japanese Red Cross Katsushika Maternity Hospital between July 2018 and June 2019.

To control confounding factors, we excluded cases of multiparous women, multiple births, cesarean deliveries, mothers with a habit

of smoking and/or drinking, mothers with pregnancy depression, mothers without partners mothers whose babies are low birth weight, and mothers whose babies were admitted to the neonatal intensive care unit (NICU) because they have been already reported to be associated with the prevalence of exclusive breastfeeding and/or postpartum depression^{4,11,16-18}.

Data collection

A face-to-face interview was conducted with the women on admission for delivery to ask them whether or not they hoped to perform exclusive breastfeeding for their babies at the delivery room of the hospital, and an additional interview was conducted one month after delivery to ask about their feeding methods at that time at the outpatient examination room of the hospital during routine check-up appointments.

Maternal mental status was examined, at one month after delivery, based on the scores of the questionnaires of the Edinburgh Postnatal Depression Scale (EPDS) at the same time of the interview. In this study, women with the EPDS scores of ≥ 9 points were regarded as 'positive screening = 50% possibility of depression', according to the results of previous observations in Japan by Okano *et al.*^{19,20}.

Data analysis

Data are presented as the mean \pm SD or number (%). SPSS Statistics software version 20 (IBM Corp., Armonk, NY, USA) was used for statistical analyses. For statistical analysis, the χ^2 test for categorical variables and Student's *t*-test for continuous variables were used. Differences with $p < 0.05$ were considered significant.

Results

On admission, 592 women (73.1%) hoped to perform exclusive breastfeeding for their babies and who met the conditions to be considered in the current study. Of these, 442 (74.7%) performed exclusive breastfeeding at one month, while 150 (25.3%) performed mixed or artificial feeding (mixed feeding: 296, artificial feeding: 24). There were no significant differences in maternal age between the two groups (exclusive breastfeeding: 32.4 ± 6.1 years; mixed or artificially feeding: 32.8 ± 6.4 years; $p = 0.11$).

The average EPDS scores and the incidence of EPDS scores of ≥ 9 points in the women performing exclusive breastfeeding were 4.3 ± 3.6 and 14.3% (63/442), respectively. These did not differ from those in the women performing mixed or artificial feeding [4.2 ± 3.7 , $p = 0.60$ and 13.3% (20/150), $p = 0.78$]. In addition, the average EPDS score and the incidence of EPDS scores of ≥ 9 points in the women performing exclusive artificial feeding was 4.0 ± 3.2 and 8.3% (2/24), respectively.

Discussion

The current results seemed to be contrary to those in some previous studies indicating that breastfeeding can protect mothers from postpartum depression⁹⁻¹¹. In this study, a trend of higher score of EPDS was observed in the women with exclusive breastfeeding group, though the results were non-significant. The current results seemed to be unpredictable for us.

To date, lower plasma oxytocin levels leading to incomplete breastfeeding have been reported to be associated with the development of postpartum depression. In a recent study by Lara-Cinisomo *et al.*¹⁰, for example, lower levels of plasma oxytocin were observed in women who had stopped breastfeeding and had postpartum depression by two months postpartum. The influence of synthetic oxytocin on a new mother's well-being has been also reported previously^{10,21,22}. Oxytocin is released across the breastfeeding cycle, and oxytocin release has been observed to exhibit a temporary anxiolytic-like calming effect on postpartum maternal mood disturbances²¹. Therefore, oxytocin is believed to mediate a calming effect on postpartum mood in primiparous mothers with breastfeeding.

However, in this study, exclusive breastfeeding did not contribute to the prevention of postpartum depression significantly. The mental status of mothers considered to have low levels of oxytocin associate with incomplete breastfeeding seemed to be stable. Therefore, in social environments and/or clinical characteristics of pregnant Japanese women, there may be some serious risk factors for postpartum depression other than the status of breastfeeding, such as personal and family factors, socioeconomic status, support from other family members and personal plans for furthering careers⁴⁻⁸. For example, in our recent Japanese study that asked mothers' biggest worry at two weeks after delivery, only 10% reported anxiety about breastfeeding⁸. Although we believe that Japan is not a poor country, recently there are some morbid pregnant women who have been reduced to poverty²³.

We understand the small sample of the current study is a serious limitations. A study in women who gave birth at BFHs may have totally different results than the current results. In this study, although we excluded the cases reported to be

associated with the prevalence of exclusive breastfeeding and/or postpartum depression^{4,11,16-18} to control confounding factors, we did not perform a further detailed comparison of the women's characteristics. In addition, although the EPDS has been the most widely used screening tool for postpartum depression in maternity and child services in various countries throughout the world, a EPDS high score does not mean the presence of postpartum depression^{19,20,24,25}.

In conclusion, development of postpartum depression does not seem to be associated with incomplete breastfeeding in Japanese women at our institute. Consequently, there must be other risk factors associated with the development of postpartum depression. A further larger study is needed to clarify these factors.

Data availability

Underlying data

Figshare: Breastfeeding and EPDS, <https://doi.org/10.6084/m9.figshare.9925070.v1>²⁶

This project contains the following underlying data:

- Dataset 1. Raw data for maternal age, breastfeeding methods and EPDS score recorded from 592 women who hoped to perform exclusive breastfeeding for their babies.

Data are available under the terms of the [Creative Commons Zero "No rights reserved" data waiver](#) (CC0 1.0 Public domain dedication).

Acknowledgements

The author wishes to thank all patients for their collaboration.

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<http://www.doi.org/10.6084/m9.figshare.9925070.v1>

Open Peer Review

Current Peer Review Status:  

Version 2

Reviewer Report 02 March 2020

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Felix Emeka Anyiam 

University of Port Harcourt , Port Harcourt, Nigeria

Summary

The article titled Relationship between postpartum depression and lactation status at a Japanese perinatal center: A cross-sectional study focused on obstetric records of 809 nulliparous healthy women with vaginal singleton delivery at 37-41 weeks' gestation between July 2018 and June. The study is relevant, as it set to highlight the benefits of exclusive breastfeeding and its relationship to maternal mental status. Although the present study did not find an association between exclusive breastfeeding and the development of postpartum depression.

Report

A. Title

The title for this study is appropriate although I think it should be reversed so that the outcome variable should be at the latter: Relationship between lactation status and postpartum depression at a Japanese perinatal center: A cross-sectional study.

B. Results

it is very difficult to follow on the reading with the results without Tables. The authors should insert result tables for easy reading and comparison.

C. Discussion

1. I am not sure what the authors mean by "*The current results seemed to be unpredictable for us*" in the first paragraph.

2. "The influence of synthetic oxytocin on a new mother's well-being has been also reported previously" should read, "The influence of synthetic oxytocin on a new mother's well-being **has also been** reported previously."
3. "The mental status of mothers considered to have low....associate with incomplete breastfeeding seemed to be stable" should read, "The mental status of mothers considered to have low levels of oxytocin **associated** with incomplete breastfeeding seemed to be stable."
4. "A further larger study is needed to clarify these factors." Should read, "A further larger study is needed to clarify these **other** factors."

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public Health, Population Health, Global Health, Epidemiological Research, Biostatistics, Open Research Data, Open Science, Data Science, Non-communicable diseases, Health care Entrepreneurship, Social Equity, Environmental Research, Maternal and Child Health, Vulnerable Populations, Population at Risk, Reproductive Health, Data Management, Community-Based Research, HIV/AIDS Prevention, TB Prevention, Health Management and Health Promotion, Computer Programming in Health.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 03 February 2020

<https://doi.org/10.5256/f1000research.24507.r59333>

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Hiroko Iwata

Graduate School of Nursing, Chiba University, Chiba, Japan

The author addressed appropriately to the issues raised by the reviewer.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Postpartum depression, maternity nursing, midwifery, childrearing support for older primiparous mothers

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 24 January 2020

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Hiroko Iwata

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Methods:

- How did the author control confounding factors? Postpartum depression is reported to have associations with multiple factors, as the author stated in “Introduction”. The author performed univariate analysis (i.e., χ_2 test and Student’s t-test), not multivariate analysis. If so, results should be interpreted carefully, or some statement as a study limitation is recommended.

Results:

- It is noteworthy and interesting that we could observe a trend of higher score of EPDS and more women with EPDS score of ≥ 9 among exclusive breastfeeding group of women, though the results were non-significant. How did the author interpret those results?

Discussion:

- The first sentence “Although the rate of exclusive breastfeeding may be low in our institute...” does not make sense for readers. The author should contextualize its meaning within the Japanese culture.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: postpartum depression, maternity nursing, midwifery, childrearing support for older primiparous mothers

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 27 Jan 2020

Shunji Suzuki, Japanese Red Cross Katsushika Maternity Hospital, Tateishi, Katsushika-ku, Japan

Response to the reviewer,

Many thanks for your careful reading of the manuscript. We appreciate your comments very much. Thank you very much for your suggestions. Based on the queries, we have re-written the many parts of the manuscript.

We have added 'to control confounding factors' in the Methods. In addition, we have added a limitation concerning the confounding factors.

We have arranged the first paragraph of the Discussion as suggested.

Thank you very much for considering our paper, again.

Sincerely yours,

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Competing Interests: None.

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